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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXIX. No. 3227.] LONDON, MARCH 18, 1925. [77TH YEAR. PRICE 1s.

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Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXIX., No. 3227.] WEDNESDAY, MARCH 18, 1925. [77TH YEAR.

EDITORIAL NOTES.

Pulling Together Splendidly.

THE industry, we are glad to learn, is responding wonderfully to the call for united action at Wembley again this year. Those responsible for organizing the Gas Exhibit there want £40,000 to run and advertise it. They could with undoubted advantage to the industry spend much more; but they can make a good show with what they have asked for—though not otherwise. As will be seen by the list we publish elsewhere to-day, they are already assured of over £30,000. That sum is subscribed as to £24,000 by 199 undertakings (out of 1500 all told)—representing roughly two-thirds of the output of the industry. If the remaining undertakings subscribe their quota, as we feel sure the great bulk will do, and if the Dominions Overseas repeat their support of last year, as they are certain to do when they learn of the special point that is being made of the world-wide character of the industry, with special reference to the use of gas overseas—the total required will be assured. But it will mean everyone pulling his weight; no one must leave it to "the other fellow."

The reason we have this confidence is that we learn that the response from the smaller provincial (and notably the more remote provincial) undertakings is quite remarkable. Over and over again, such undertakings are subscribing as much as they did last year—one, for example, giving 6s. 3d. per million, another 7s., others 4s. or 5s. Some of the latter are "making amends," it would seem, for half-hearted support last year, because of the effect of last year's exhibit that was felt throughout the country. Others that were keen enough last year are even keener this—and so the story of backing and trusting headquarters goes on.

It is splendid—and it is so very right and so very necessary. The industry is well served at headquarters; better than it can possibly know, because much that is done really cannot be shouted from the housetops. Just as a country has to trust its ambassadors and diplomats and its defensive services, so an industry which, while organized as a unity, has its components broad-scattered over the face of the land. It is because, in times that call specially for organized joint effort for the protection and the advancement of the industry, such a proportion of the industry has promptly shown the strongest of all evidences of its belief and confidence in its leaders ("money talks" unmistakably) that we rejoice and have faith that the remainder of the industry will follow that example, and will provide every penny of the minimum sum required to make Wembley in 1925 a success as great as, or greater than, Wembley in 1924.

"It's a long way to Tipperary"—yes, a very long way from Wembley. But Tipperary has subscribed its three shillings per million to the fund; and so have many other Irish companies. Is there any English or Welsh or Scottish undertaking willing to declare itself less British than Tipperary, or Cork, or Kilkenny?

Progress of Therm Orders.

THE National Gas Council have again compiled for their members, and printed separately, a list of undertakings possessing Orders under section 1 of the Gas Regulation Act, together with information as to the old maximum and standard prices, the new ones, the present declared calorific powers, and changes since the first declarations. The only suggestion we have to offer is that it would be useful if, after the name of each undertaking, indication was given as to ownership—company (*c.*) or local authority (*l.a.*). The compilation takes us up to Dec. 31 last. Naturally, as time passes and Orders are issued, the rate of progress in conversion from the old to the new system will be slower, as every new Order issued means so much less to be done. At the same time, there is much to be accomplished to bring into line the local authorities, whose resistance or shallow reasoning was well exemplified by the interview which a deputation had recently with the Board of Trade (p. 542), and was emphasized by editorial comments in the same issue (p. 513). To increase the rate of adoption, it will be necessary, if the outstanding local authorities do not apply voluntarily, to deal with them under sub-section 5 of section 1. When the Director of Gas Administration (Mr. H. C. Honey) was speaking at the President's luncheon on the occasion of the last annual meeting of the Institution of Gas Engineers, he stated that the total number of statutory undertakings which had obtained Orders under section 1 was 549—415 companies and 134 local authorities—leaving 65 companies and 167 local authorities still to be dealt with. Since then there has been a lag in the movement to toe the therm line, for the total number of Orders issued to Dec. 31, according to the National Gas Council's compilation, is 570, which is only 21 better than Mr. Honey's showing in the previous June. When one considers this, it is not surprising that the Board are of opinion that, if voluntary action will not reduce the large number of non-conforming local authorities, the compulsory authorization conferred by Parliament upon the Board must be put into operation. However, looking at the tabulated statements, it is found that the declared calorific values run from 280 B.Th.U. for Nuneaton to 600 B.Th.U. for Lampeter. The favourite zone is from 450 to 500 B.Th.U. There are 172 declarations of 500 B.Th.U. and 135 of 450 B.Th.U. Between those two figures there are 161 declarations. Therefore, of the 570 undertakings under the therm system, no less than 468 have declarations between and including 450 and 500 B.Th.U. There are only 28 undertakings with declarations above 500 B.Th.U.; and, excepting 29 undertakings with declarations at 425 and 17 at 400 B.Th.U., the low ones are sparse. There have been changes from the first declarations of calorific value by about seventy undertakings—in some cases from differential calorific value for different parts of the area of supply to a uniform value. In only seven cases do we notice that the declarations have gone to a lower level; in all the others they have ascended. Again, the favourite figures to which there has been ascent lie between 450 and 500 B.Th.U. Somewhere between those figures general practice will, we think, continue for long ahead, having regard to the conditions in respect of plant, and the disinclination to convey larger volumes of gas of lower thermal value.

Long Association of the Gas Industry with University Life.

That the association of the gas industry with the Universities is a modern institution is one of those inexactitudes that grow in new times through an indifference to research. The President of the Midland Association is Mr. W. E. Caton, of Oxford; and the address he delivered last Thursday shows how the records of his Company testify to the fact that the scientists and learned men who were the rulers in the University life of that city a hundred and more years ago took large part in the birth of the concern which exploited a great discovery for the service and convenience of the University and the city. The same could be said of Cambridge. But our interest just now is concentrated by the address upon Oxford; and it reveals how the heads of colleges, dignitaries of the church, professors, and fellows of colleges associated themselves with citizens in obtaining an Act of Parliament and founding the Company in 1817-18.

Though the University of Oxford took such a large and enlightened part in the genesis of the Company 107 years ago, we are more than surprised to find that in 1923-24 the learned heads joined forces with the Corporation in opposing the Company in an application which they made to the Board of Trade for a Special Order, part of which was for the restitution of the power to work up and convert the secondary products, which power the Company permitted to be taken from them in their 1882 Act. The conversion and working-up of the secondary products of the carbonization of coal to-day is an innocuous proceeding; and it is difficult to understand why the University with knowledge of the science, art, and practice of these matters at their command should have made the restoration of the desired power the ground for an objection. But it was so. By that act the obligations of science to the gas industry were ignored. The disclosure of the valuable diverse properties of coal by the operations of the industry, and the yielding by it of materials for extensive and world-enriching scientific work, should have made the University the friend and not the opponent of the Company's proposals. With all that has been done in the exploration of the products of coal, and in their application to countless utilitarian purposes, the work has still to go on, for succeeding discoveries almost suggest the infinite rather than an approaching end to profitable research into them. Hence the work that is being carried on far and wide in the Universities which bears upon the operations of the industry; hence, too, the investigations that are being prosecuted (through the founding of the Livesey Chair) in the Department of Coal Gas and Fuel Industries at the Leeds University. Science and industries have a large dependence upon the carbonization of coal for gas manufacture; thus the close association of the Universities with the industry. As Mr. Caton shows, the alliance is no new thing; in the case of Oxford it dates from 1817-18. Men in University life who associated themselves with the industry in those early days, no doubt did so for two motives—first and foremost, because they realized the importance of the service that gas could render; and, secondly, owing to that service the commercial possibilities. But mentally clever as were those men, their vision was limited. They little thought of the field the industry would provide for science and study. We can see to-day what they could not see then, because we are living in times when enormous developments have been made from those small beginnings in which the learned ones of Oxford took part 107 years ago. We look at the future in the light of past achievement and present activity; and we know there will be further developments. The directions and the measure we cannot predict. If corporations who do not own gas undertakings sometimes adopt a mistaken attitude towards the industry, we may at least expect those erudite ones at the head of our Universities to see things in the true light, and to adopt a proper perspective.

There are several incidental points in Mr. Caton's address which are of considerable interest. As we read, we were beginning to think that Oxford was going to make the claim that Murdoch should be deposed from our affection and admiration for the work that he did in making practicable the general production of gas and in applying it to the service of man. The researches of our old friend, Mr. James Eldridge (the predecessor of Mr. Caton in the chief executive office of the Oxford Company), into the early history of gas in the city brought about the discovery in the local papers of those days of a reference in 1784 to the use of "inflammable air" for balloon purposes by Mr. Sadler, of Oxford, who was Inspector-General of Chemistry to the Admiralty. But no mention is made of Mr. Sadler having used the gas for illumination purposes before the end of 1817; and Murdoch was lighting his house at Redruth by it in 1792. Thus again Murdoch refuses to be deposed. Another interesting point is that the founders of the Company built two holders of 10,000 and 12,000 c.ft. respectively, and imprisoned them in houses built of tooled stone, clamped and strengthened in every possible way. In "The Isis" (the University magazine) a contributor possessing a spacious mental capacity and diversity—a wag, a cynic, a dilettante, and other things which we will not print—has penned an article [see p. 667] on the Company's large new gasholder of which he justifies the existence on æsthetic, ethical, and religious grounds. We wonder what he would say about those two pigmy "gasometers" which the heads of the University in collaboration with other enterprising individuals of over a hundred years ago enclosed in two strongholds as though they were wild beasts. Knowledge has moved forward—in Oxford as elsewhere. One more point. We have always been strongly opposed to the contribution of the profits of municipal undertakings to the relief of the rates. Mr. Caton has divulged the fact that at one time the Oxford Company were working under a clause which made it obligatory upon them to transfer to the local authority in aid of the general district rates any profits over and above the amount required for the prescribed dividend and for making up the insurance fund to the sum then authorized. That clause was in the Company's 1869 Act. We do not know whether any profits were ever handed over; but we can understand in the circumstances the Directors would take good care to give the consumers gas at the cheapest obtainable rate, so that there should be as little excess profit as possible. The obnoxious clause was not repealed until 1892; and its low value to the Corporation is seen by the fact that the repeal was obtained at the price of the presentation to them of 5 p.ct. debentures to the amount of £1000!

We heartily congratulate the Company upon the rapid progress of the concern and upon its strength. In 1918 the consumption of gas was 433 million c.ft.; to-day it is 723 millions—an increase during that period of 67 p.ct. Now the Company have in hand the construction of entirely new works on a site adjacent to the present one; and it will be learned from the address that Mr. Caton is adhering to horizontals. More of what he is doing will be seen when the members of the Association pay a visit to Oxford in May.

The Fit Fitter.

A paper was read at the meeting of the Midland Association of Gas Engineers and Managers to which the attention of all readers of the "Journal" is earnestly invited, because the topic with which it deals should and must be one of the cardinal considerations of the gas industry at the present time. Engineers have told us that the members of their gas-fitting staffs are to-day fully employed, and that had they a greater number of qualified men there would be no lack of work for them. This shows that the supply of such men is now unequal to the demand; and, therefore, it should be the business of the gas industry to see without further delay that adequate provision is made. The future is somewhat nebulous as to the nature of the demand—from the quantitative point of view. The movement is, perhaps, slow towards the general adoption—perhaps "application" would be a better word—of the policy of inspection and maintenance; but we have a feeling that it is sure, and for several reasons is bound to come. As the policy is applied, so the demand for qualified fitters will progressively increase. We have to anticipate that time. And the farther we go, the more essential it will be that all gas-fitters should be as efficient as it is possible to make them. The efficient gas-fitter is a

contributor to the degree of efficiency and the satisfaction enjoyed by the consumer. Moreover, administrators and managers of gas undertakings should not overlook the fact that the gas-fitters and the meter index readers are the only individuals belonging to a gas undertaking who meet the majority of the gas consumers. That point is worth pondering over. If it is thoroughly examined and weighed, the result must be that every management will see that there is a responsibility to the gas undertaking, to the consumer, and to the fitter himself, to ensure that that member of the public service organization is fully competent for his work and for meeting consumers as an emissary of the concern.

The paper to which reference is made in the preceding paragraph was written by Mr. R. J. Rogers, the Chief Superintendent of the Gas Fittings Department of the Birmingham Corporation. No one can question the authority of Mr. Rogers when he talks on the subject of the education of the gas-fitter. He has made a long, thorough, and serious study of that worker and the qualifications essential to enable him to put real competence into his work. When, therefore, Mr. Rogers asks: "Are we doing everything possible to ensure that the gas-fitter gives the best service to our consumers?" we may be certain that he would not put the question without a reason; and we find it before penetrating far into the paper. He writes: "Speaking from my experience as Chief Examiner in Gas-Fitting, I am bound to confess that, in my opinion, there are a good number of gas undertakings which do not yet realize the importance of the gas-fitter's place in the circle of service, and who give little or no thought to his training." That reflects an indifference the existence of which is bad for the industry. The reflection is accentuated when we read that only 19 fitters out of the whole of the British gas industry presented themselves last year for the Final examination, and 78 for Grade II. examination; and we remember that in his report Mr. Rogers felt it incumbent to animadvert rather severely upon the character of the work of some of the candidates. The paper constitutes a strong appeal to the industry to mend its ways in the matter of educating and training the fitters so as to increase their competence to the advantage of all concerned —undertaking, consumer, and craftsman himself. We are confident that Mr. Rogers is right. We have come across men doing gas-fitting work in a slovenly manner which is a good indication of incompetence for the job, and of a flaw in the system of management. It is no use tuning up parts of the elements of an undertaking and leaving the others out of harmony. But that is being done in many cases, with the result that some undertakings have fitters many years behind the times, notwithstanding that responsibilities and claims to higher efficiency are rising day by day.

What should be done for the better education and training of the fitter? Undertakings which do look after this work have their own methods. There is no standard way. But the paper tells us of the thorough educational and training system in vogue at Birmingham, where the Gas Department have been training gas-fitters for the past twenty-six years. As the details of the scheme are perused, there will be many engineers of smaller undertakings who will at once jump to the conclusion that this sort of thing is beyond them. But Mr. Rogers, with his large experience and broad consideration of the subject, meets that with the positive view that the methods adopted by the large undertakings are easily capable of modification and application by smaller ones, without greatly impairing the efficiency of the scheme, provided the necessary encouragement is given by the responsible head of the concern. A session's work should always end with examinations and awards; and at Birmingham, if a fitter can pass the Final examination in gas-fitting of the City and Guilds of London Institute, a permanent increase of 2s. per week is made in his wages. Such men are well worth the extra reward; and their training causes them to aspire, as they are fitted, for promotion to positions such as fittings inspectors, new buildings inspectors, and so forth.

This question is a vital one for the gas industry. The conditions of the gas business demand more qualified fitters; and we are moving forward into times when a further extension of the supply will be needed. Our advice is, Be Prepared.

The pinch in respect of qualified men is being particularly felt by those large undertakings which employ outside "plumbers" to deal with their requirements. Several of them have of late been finding it impossible to prosecute work for the consumers with that promptitude and efficiency which should obtain in a well-organized concern. That must be changed. It is an urgent matter. And while taking steps to give effect to the change, we wish all officials of gas undertakings would make the pious resolution to call a gas-fitter a gas-fitter, and not a plumber. It is a "terminological inexactitude" which should be avoided for several reasons, all of which must be well known in the gas industry. Gas-fitting is a job for special training in these days of diversity of gas apparatus, requirement, and performance. The tenuity of knowledge of such matters among outside plumbers is somewhat pronounced, which is not an advantage to any gas undertaking.

Electrical Arithmetic.

Our electrical friends are noted for their humorous, stunted, and careless examination of statements made in the gas industry as to the relative positions of gas and electricity in competition. An excellent example of this is provided by the writer of "Cooking and Heating Notes" in the "Electrical Times." Mr. John Greene, Chairman of the Bury St. Edmunds Gas Company, made, at the annual meeting, some comparisons of gas and electricity. We do not agree with him that electricity in process of time will almost completely cut-out gas for purposes of lighting. Of course, what he predicts will happen if those responsible for the proper prosecution of the gas business refuse to work by the available means to prevent such a consummation. But it was on the score of heating that Mr. Greene laid claims which have been subjected to criticism in our electrical contemporary, with the result that it has made a sad hash of it. Mr. Greene said the Corporation charge 2½d. per unit for electricity used for heating purposes, with a discount of ½d. per unit—making the net charge 2d. During the year the Gas Company sold 351,000 therms at a cost of £15,553 to the consumers. If the Electrical Department of the Corporation had been called upon to supply the equivalent in heat units of what the Company supplied in gas, they would have had to supply 10,218,000 electrical units, which would cost £85,952 to the consumers. Our contemporary does not deny the accuracy of this statement as to the position between gas and electricity; but it runs off into a comparison between gas and coal, and shows an astonishing incapacity for arithmetic and for carrying comparison to a logical conclusion. Supposing a community has to be supplied with heat to the extent of 351,000 therms; and that at the Bury prices the respective costs of gas and electricity for that quantity of thermal energy are £15,553 and £85,953; then, asks our wise friend, What of coal? He replies: "Coal of 10,000 B.Th.U. calorific value [" calorific value" here is redundant] per pound, contains potential heat value of 224 therms per ton; 157 tons contain 351,000 therms, and at 55s. per ton, this would cost only £431 15s. That is less than one-thirtieth the cost for gas of similar heat value." We ask the critic to make his calculation all over again, because we submit his 157 tons should be 1570 tons, and his £431 15s. should be £4317 10s. The corrections alter considerably the aspect of the comparison—in fact, they upset completely the whole structure of the critic's argument. But let us take it farther. For every purpose to which heat is applied, a different efficiency is realized; and every heating agent has its own range of maximum heating efficiencies. The best efficiency coal can give in domestic service is about 24 p.ct. in useful heat for room warming; for other purposes, efficiency follows a steep curve downwards to a very low point. With the efficiencies at which gas can be used in domestic service, it would take at least four times the potential heat supplied by coal to render equivalent useful service—to say nothing of the stand-by losses with coal through the impossibility of conveniently lighting up and extinguishing at will as in the case of gas. If the electrical people cannot do better in comparative work than to make such muddles as the writer in the "Electrical Times" has done, then they had better, in their own interests, leave the work to people better qualified to present the truth. The only saving feature is that the same writer admits that gas has advantages over coal; but he spoils the admission by stating that the advan-

tages are possessed by electricity to a higher degree, and therein lies the superiority of electricity over gas for heating. Will the writer in our contemporary tell us without further postulation, but in plain terms, what is the advantage that electricity possesses over gas in respect of money economy for doing an equal amount of work? In making his calculations to answer the question, we hope he will not indulge in more of the slipshod arithmetical evolutions which we have exposed.

The Gas Fund.

For the current year, the Board of Trade announce a reduction of 9d. per million c.ft. of gas sold in the rate of contribution to the Gas Fund. The figure will therefore be 1s. 3d. per million c.ft.; the basis being the gas sold during 1924. It is a slight to the Gas Regulation Act that payment should be based on cubic feet, and not on therms. Why not adopt 1000 therms?

Electricity for Gas-Works Purposes.

The strongest possible protest must be made against, and resistance offered to, the interference by the Electricity Commissioners with the manner of providing electricity for the running of a gas-works owned by a public authority. The matter has been raised in connection with the borrowing of money for works extension, including electricity generating plant, by the Goole District Council. The Ministry of Health consulted the Electricity Commissioners on the subject of the generating plant, and that body advised that the Council should take the energy required from the Electricity Supply Company. Apart from the fact that every gas-works possesses the requisite fuel and facilities for cheaply generating the current needed for plant operation, there is the advantage of a greater security to the users of gas in the provision of the power required being under the direct control of the management of the gas-works. In the public interests, there should be no failure of gas supply owing to a failure of electricity supply. It would be very awkward for the public to have such simultaneous happenings. The Central Executive Board of the National Gas Council have advised that intervention by the Electricity Commissioners in such a matter should be resisted. The whole gas industry will support that view.

Company Prospectuses and Gas Shareholders.

There is not the slightest objection to prospectuses of genuine companies being circulated among gas shareholders; but there is a strong objection to the type of prospectuses to which we have frequently of late been calling attention. The South Midlands and Berkshire one which was criticized last week is typical of these outrageous documents. Only this week we have received a copy which was addressed to a young lady gas shareholder. There ought to be some means whereby the gas industry can protect investors in it who are unable to gauge the commercial possibilities of these concerns.

Standard Cookers.

An announcement is made in the minutes of the National Gas Council (published on a later page) as to the discounts which will be allowed to purchasers in quantities of the "Standard" gas-cooker.

Summer Time.

Last Friday second reading was given by the House of Commons to the Summer Time Bill—a measure to provide for the permanent adoption of summer time, thus doing away with the uncertainty experienced the last few years as to what was going to happen in this respect. It is proposed that the period shall be from the last Saturday in March or the first in April to the first Saturday in October. We quite approve of the Bill; but we do wish honourable members would refrain from rubbing-in so much the saving in artificial light. While not negligible, it is not so important to the gas industry with its good custom for gas for cooking and water heating, but electricity undertakings in residential areas which depend substantially upon the lighting load do not like to be reminded of the cumulative loss that is suffered.

Bitumen v. Tar.

The tussle between these two materials for the dressing of roads in proximity to fisheries is getting more acute. The National Association of Fishery Boards have passed a resolution recommending the use of bitumen instead of tar. The Central Executive Board of the National Gas Council have taken counter action in the matter. Through their instrumentality, too, the Bill of the Surrey County Council has been modified. As originally drafted, this would have enabled the Council to exercise pressure upon local authorities to use bituminous substances instead of tar in the case of certain roads.

Rays of Light in Labour Circles.

There are the beginnings of division in the camps of the trade unions. The moderate men are alive and anxious as to the continued trade depression and unemployment in the country; and they see no way of improving these conditions until there is a concentrated effort on the part of all concerned. It is, they recognize, only through an improvement in the health of industry that the conditions of the workers can be further enhanced. So far as it goes, that is satisfactory; it would be more so if conviction was followed by action. But to their dismay they find that lethargy has allowed the Communists—the wild men of the labour world—to get an amount of control of their organizations which cannot now be readily shaken off. These men are utilizing the present conditions to make more strife, and to worsen the already bad conditions. Mr. Philip Snowden says they are the worst enemies of the working class; and he is right. They are actively at work trying to create greater unrest. It is due to their efforts that attempts are being made at the present time to create a gigantic labour alliance. But this is not going to be an easy matter.

Antagonistic Interests.

For example, the leaders of the engineering unions know that the industries which give their members employment want cheaper coal and transport. They see work which should be done here going to the Continent, where the costs of labour, coal, transport, and taxes are less than here. Therefore, how can they help the miners who want more money for still less output, though more pay for less production has already been highly detrimental to the economic state of the coal industry? How too can they help the railwaymen who want to put a burden of 30 to 40 millions sterling upon the country, while the country desire lower transport charges? If the railwaymen obtained the increase, it would advance the cost of coal distribution to the disadvantage of industries all over the country. How can the railwaymen support the miners when they know that a large amount of coal traffic will be lost if coal gets dearer, and fewer people want to buy? The promoters of the proposed alliance are simply aiming at giving industry a staggering blow while it is weak. They call it mutual help! The real idea is revolutionary.

An Industrial Truce.

All this is happening while the Prime Minister is appealing for an industrial truce between masters and men. Several of the leaders of the unions have referred sympathetically to the Prime Minister's suggestions; but they ask whether his idea is to make wages unalterable. We do not so understand it. There should be no stereotyping of wages any more than there should be stereotyping quantitatively a man's production. The folly of the policy of some of the trade unions in this respect has now come home to roost; and other countries where trade union rules are not allowed to have a repressive influence upon production are bagging our business and thinking what a lot of helpful fools we are—including the trade union leaders who have been largely responsible. Instead of trying to bring about an alliance of elements which cannot properly synthetize, they had better try to associate themselves with the work of doing a share as citizens in pulling the country out of the industrial straits into which it has fallen.

Miners to Make a Test.

The Prime Minister recently suggested that Mr. A. J. Cook and his Communist friends should purchase a colliery, and prove the possibility of maintaining a substantial living wage, only working six hours a day. It would be an excellent

thing if some of these noisy strife-creating extremists would put their silly abstract ideas to the proof of practical test. But when someone gives the opportunity for it to be done, these very men jump up in a state of alarm, and try to stop it. Why, we have not the faintest notion; other than that they realize if their tenets and notions are proved to be without substance, they will lose the places into which they have forced themselves. Mr. Cook and the North Wales Miners' Association are much troubled over the action of some 700 men at the Vauxhall Colliery, North Wales; and they have threatened them with the loss of membership of the union if they persist in what they have pledged themselves to do. The colliery has not been paying on the old lines of work. The owners consequently decided to close down. But the men believe they can work it, and make it pay. Perhaps they can if they have the will, and put their backs into it. But the Communists do not want men to show the real stuff of which they are made. The owners have therefore entered into an agreement with the men for them to run the colliery for three months. If they cannot produce sufficient revenue to pay wages and other costs, the men are to bear the loss. The men have agreed to make the trial. There is good sportsmanship in this; and a fund, headed with £200 by the royalty owners, has been started to guarantee them against loss. We shall not be surprised if those men prove that circumstances exist under which that mine can be made to pay. The Communists are holding up their hands in unrighteous horror. Why?

PERSONAL.

Mr. WILLIAM PHILLIPS, Secretary, Engineer, and Manager to the Luton Gas Company, has been returned as one of Luton's representatives on the Bedfordshire County Council—beating the former representative, a retired schoolmaster, by 49 votes. This is the first time Mr. Phillips has sought County Council honours.

The Heywood Town Council have, says the "Manchester Guardian," agreed to a proposal that Mr. R. PRINCE be promoted to the post of Manager at the Heywood Gas-Works, at a salary of £350 per annum; and that Mr. W. WHATMOUGH, the present Manager, be appointed Engineer, at a salary of £300 per annum. It was explained that Mr. Whatmough desired a little more freedom from responsibility, and had made a generous sacrifice of salary. The arrangement meant a saving to the town of £165 per annum as compared with the salaries paid at present.

OBITUARY.

The death has occurred of Mr. ROBERT JAMES BENNETT, at the age of 77. It is six years ago since he retired from active work in the industry, but to the end he evinced a lively interest in all gas matters. For fourteen years he held the position of Works Superintendent at the Halifax Corporation Gas-Works, under the late Mr. William Carr; and during this period he assisted in the installation of the first regenerative furnaces there, and of the first sulphate of ammonia plant. After spending some time with Messrs. Robert Dempster & Sons, of Elland, he took up the position of Works Superintendent at the Bromley (Kent) Gas-Works. He was then appointed to a similar post at the Stalybridge Gas-Works, where he remained for twenty years. During the war Mr. Bennett was sought out of retirement to manage the Newry Gas-Works, in the absence of Mr. Ellacott, who was away on war work. Later he assisted his son, Mr. William Bennett (who is now Engineer and Manager to the Mossley Gas Department) in the management of the Lytham Works. He leaves one son and four daughters.

Midland Junior Gas Association.—At a meeting to be held in the Council House, Birmingham, on Friday evening, March 27, a paper on "Town Gas Furnaces and Recovery of Waste Heat" will be read by Mr. W. Newton Booth, Assoc.M.Inst.C.E., of Woolwich Arsenal (President of the London and Southern District Junior Gas Association).

Uniform Pipe Weights.—Writing from America, a correspondent remarks: "I understand that over there the steel mills make three different weights of pipe and fittings—one for gas, one for steam, and one for water. I wonder why they don't standardize for the regular or most used sizes—make one weight same as they do in this country. It would save a lot of money to both the manufacturers and the distributors. Over here if one wants a piece of 1-in. pipe, the piece bought will do for either gas, steam, or water."

NORTHERN STAR LODGE, No. 3053.

The installation meeting of the Northern Star Lodge, No. 3053, was held on Feb. 27, at the Midland Hotel, Manchester. The retiring Master, W. Bro. Ernest West, occupied the chair at the opening of the Lodge, and with due ceremony installed his successor, Bro. James Bridge, S.W., who subsequently invested his officers. The following is the full list of officers of the Lodge for the year 1925-6.

W. Bro. James Bridge	W.M.
W. Bro. Ernest West	I.P.M.
Bro. Harry Butterworth	S.W.
Bro. Samuel Shadbolt	J.W.
W. Bro. L. B. Taylor, P.Pr.G.D., Staffs	Chaplain
W. Bro. T. W. Jordan	Treasurer
W. Bro. Thornton Ousey, P.Pr.G.Stwd., Ches.	Secretary
W. Bro. J. W. Scott, P.Pr.G.D.	D.C.
W. Bro. Joseph Taylor, P.Pr.G.D.	A.D.C.
Bro. Frank Hyland	S.D.
W. Bro. C. E. Teasdale.	J.D.
W. Bro. E. J. Wellens	Organist
W. Bro. R. J. H. Sayers, P.Pr.A.G.D.C. W. Lancs.	Almoner
Bro. Alexander Mackay	I.G.
Bro. Harold Hutchinson	Steward
W. Bro. W. J. Smith	,,
Bro. T. Duxbury	,,
Bro. J. H. Ranft	,,
Bro. R. B. Glover	,,
Bro. James Mitchell	,,
Bro. George P. Mitchell	,,
Bro. Joseph Hall	,,
Bro. J. T. Haynes	,,
W. Bro. S. Meunier, P.Pr.G.D.	Charity Representative
W. Bro. H. Firth	Tyler

ELECTRICITY SUPPLY MEMORANDA.

IT has been shown in the last two issues of the "JOURNAL," and the information is concluded in this one, that gas has an excellent representation at the Ideal Home Exhibition at Olympia. We cannot imagine an "ideal" home without gas in it. The packing of the house with accessories which run into a large expenditure and are not economical but troublesome in service, makes a house anything but ideal. What is wanted in the ideal home is an agent which saves labour, smoke, and dirt, is efficient, and at the same time costs the least of any agent which claims to minimize work. Gas can claim to be that agent. There is a saving of labour (but waste in other respects) by using electricity while it behaves itself, which it does not do for long. When anything goes wrong with it, labour and bad temper accompany each other with rising force. However, electricity is illustrating at Olympia what it can do; and it is doing it much better than has been the case for some years now at that particular show. But we are not altogether sure that the anticipated presentment of an Electric House by the Electrical Development Association has been fully realized; in other words, it does not come up to expectation. The expressions regarding it in our electrical contemporaries cannot be said to be warmly congratulatory; and it seems evident, reading between the lines, that they have been looking for something on a more gorgeous scale. The "Electrical Review" says: It was not to be expected that the exhibit arranged by the "E.D.A." would be as excellent as the Association's display at Wembley last year; but considering the short period of the exhibition, space limitation, and other very different conditions, the all-electric house compares very favourably with its larger prototype. The "Electrical Times" describes it as "a more modest venture than that seen at Wembley." There are, however, no very enthusiastic expressions of opinion regarding it. The "Review" can rarely (if occasion favours) avoid saying something funny. It remarks: "As a counterblast to the 'E.D.A.' display, the gas industry has a similar model dwelling, with all-gas equipment, in close proximity to the 'all-electric' house." That is not a fair way of putting it. The "E.D.A." effort is a counterblast to the all-gas house, seeing that there have been a good gas display and a gas house regularly at the Ideal Home Exhibition, and the electrical co-operative display is a new feature this year. Which is the counterblast?

At the Ideal Home Exhibition.

The Equipment.

"Electric House" contains a hall, dining-room lounge, bedroom, bathroom, kitchen, scullery, and garage; each room being equipped with the appliances deemed most suitable by the organizers. There is a striking feature about the descriptive articles that have been published at the time of writing these notes; and it is that they give more prominence to the small novelties found in the display than to the main and most expensive part of the equipment. A house-

holder must be a fabulously rich person who can afford to introduce into his establishment the hundred-and-one little but expensive things which the electrical inventor offers to him. A user of electricity might be able to afford an electrically illuminated number plate on his front door; he might even run to an electric bell attached to the flap of his letter-box, so as to be apprised of the fact that the flap had been lifted whether by honest or dishonest fingers. He might also for security run to a "cat burglar" alarm. But these are not the sort of things that will add greatly to the prosperity of the electricity supply industry. It is found that electric washing machines are too expensive to secure a large patronage. That being so, how many people are likely to purchase an electric sideboard—a sideboard wired to accommodate small electric appliances for the making of coffee, tea, and toast, keeping plates warm, &c.? We hazard the view that there are very few. The same applies to electrically heated carpets, mats, and so forth—all interesting novelties, but not of much account as contributors to the greater prosperity of the industry. Yet the technical papers give great prominence to them! The things that matter so far as the consumption of energy goes—such as electric cookers and fires—do not receive much attention. Of course, when electrical men are bound to speak the truth and nothing but the truth about these things, they cannot say that the hotplate of the cooker is an aid to economy in the household, and therefore that it is ideal for the purposes it is called upon to serve. The same with the electric fire; honesty enjoins them to tell the consumer who is looking for a labour-saving, non-smoke producing room heater that for constant use an electric fire has a remarkable draining power upon a householder's financial resources. One good feature of the exhibit is that in each of the rooms provision is made for demonstrating to visitors in a practical way contrasts between good and bad lighting. Water heating also receives exposition; but there again, when comparison is made with other forms of heating, economy and good speed are shown to be non-existent. We do not wish to disparage the efforts in display of our electrical competitors; but one has only to investigate, by the aid of knowledge of these things, what is to be seen at the Ideal Home Exhibition to understand the limitations under which the competitor pursues a campaign with the view to superseding an agent of marked superiority in all ways.

How Costs Creep Up.

It has been observed on several occasions that in public electric lighting there is a tendency for the expenses to creep up. This is generally due to the fact that the lamps originally installed are, in order to present the best case possible, usually of insufficient candle power to supply the illumination that is required or is best suited to the street or other open space. When dissatisfaction begins to grow and makes itself uncomfortably felt, lamps of larger wattage are installed; and to instal them money has to be spent beyond the original estimate. Then there are the extra costs for maintenance and the increased consumption. Take as an illustration the lighting of the Victoria Embankment. There are at present 67 lamps of 300 watts on the parapet wall. It is considered by the London County Council that the lanterns are not altogether suitable. Therefore there is experimental work in hand to see what can be done to improve them. The lanterns are carried by a cradle with four arms, one of which, coming directly in front of the lamp filament, prevents the direct rays of light being thrown across the foot-way. As an experiment, one obstructing arm was removed and a large pane of glass fitted. Now it is proposed to alter, in continuation of the experiment, a further five lamps at a cost not exceeding £4 10s. each! Thus if the 67 lamps are eventually modified, this will mean, at £4 10s. each, £301 10s. In addition 500-watt lamps are to be installed in place of the 300-watt ones, at a cost of £306, including automatic cut-outs and reflectors. Prismatic reflectors are also to be fitted to two lamps on the refuges near Cleopatra's Needle at an outlay of £20. The energy for the larger lamps will result in an increase in the cost of maintenance of from £420 to £700 a year—a difference of £280. We believe in improvements being made in street lighting; but the progressive advance in costs to secure efficient lighting with electricity frequently has a bearing on the original estimates which were placed in comparison with gas lighting, and on which the change was effected from the one system to the other. Experience accumulates which shows that public electric lighting costs do not remain where in the first instance they were placed.

Cooking Evasion.

A striking feature of some electrical writings is evasion—a complete omission of a recognition of pertinent facts. "Megohm," writing in the "Electrical Times," speaks of the passive interest of contractors in electric cookers; and he makes remarks which show that he conveniently confines the meaning of "cooking" to the work done by the oven of an electric cooker, although the mass of the operations takes place on the hotplate. He asks how many contractors have read the recent report on the subject by the General Purposes Committee of the London County Council. [See "Memoranda" for March 4.] Those who have will have learnt more than they will do from "Megohm's" notes. Of course, we do not accept all the views of the Committee—for example, this one: "For baking and roasting, electric ovens possess considerable advantages over gas ovens; they are not more costly to use, are reliable, and are capable of producing more consistent results than the gas oven." "Megohm" quotes this, but omits in this connection a most important sentence from the report. It is to the effect that electric cooker hotplates cannot be regarded as so cheap or reliable as gas rings. To ignore that statement is an evasion of a point that is of far greater cumulative importance to the householder than the performance of the oven; and as to that it would be easily possible to demonstrate that the Committee have no depth of accurate knowledge regarding the matter. "Megohm" is of opinion that the latter are convinced as to the advantages of electric cooking over gas; but he is swayed with doubts as to whether contractors have taken the trouble to convince themselves. The Committee are not convinced as to the advantages of electric "cooking;" they limit themselves to the oven and the grill—the hotplate work not being so cheap or reliable as when accomplished by means of gas. That is a different story, and is important seeing that the hotplate carries a large responsibility in respect of kitchen economy—three or four times more than the oven. Our friend urges electrical contractors to be greater load getters through electric cookers. That is all very well. Customers for electric cookers do not turn up every hour of the business day, or every day of the week; and idle capital is a waste.

Hastings and Elephants.

The members of the august assembly who direct the local government of Hastings were talking the other day of how best to advertise the town. One of the councillors suggested that the Entertainments' Manager at Hastings should get two elephants to give children free rides. The illustrated papers would then publish free pictures, and so advertise the town. Hastings once had a white elephant in the form of the electricity undertaking, which required much from the ratepayers to keep it alive. The concern has been doing better the last year or two; and it is now in a position to reduce the price of current. But it is proposed to indulge in a big scheme of extension into the surrounding country. The scheme contemplates going eastward as far as Rye, and westward to Hailsham. The estimated cost is £68,707. Just recently we heard from experts how transmission represents about 60 p.ct. of the total costs of an electrical undertaking—sometimes more, sometimes a little less. The figure is important, particularly when the transmission is through sparsely populated areas. In such a case, the average of the costs over the whole concern must be increased by the extensions. Perhaps the white elephant will reappear at Hastings and make further demands for maintenance. The Entertainments' Manager has not been instructed to procure a couple of elephants in order to give children free rides.

The Uncontrolled Lamp.

We rather fancy the Consett Iron Company have learned, as other people have done, that it is bad business to supply current to lamps for lighting at a fixed charge. The Company are the owners of Chopwell Colliery; and the streets and houses of Chopwell are lighted by electricity supplied by the Company. Of the houses some 760 are occupied by the miners and their families. In 1911 the Company agreed to supply the miners with light at 6d. for the first lamp installed and 4d. for each additional one. The miners have made an attempt to secure a reduction of these charges. The Company intimated that from the beginning of the year they would instal meters at a rental of 1s. 6d. per quarter, and charge 4d. per unit. That is a more businesslike proposal than unrestricted supply. The miners very strongly objected to pay meter charges; no doubt they have an aversion to meters altogether—preferring unrestricted supply at so much per lamp. The Company cannot do business even with the miners other than on a proper basis; and so there has been a stoppage of the service. We have not heard whether this has led to an acceptance of the Company's very reasonable terms.

Eastern Counties Gas Managers' Association.—The Hon. Secretary and Treasurer (Mr. W. H. Mainwaring) informs us that it has been decided to hold the spring meeting of the Eastern Counties Gas Managers' Association on April 22 at Newark-on-Trent.

London and Southern District Junior Gas Association.—At a meeting of the Association to be held next Friday, March 20, at the Westminster Technical Institute, Vincent Square, S.W. 1, at 7.30, two short papers will be read—one on "Condensers," by Mr. F. White, B.Sc., of the South Metropolitan Gas Company, and the other on "The Modern Drawing Office, and its Place in the Scheme of Gas Works Management," by Mr. J. E. Ledingham, of the Tottenham District Light, Heat, and Power Company. On Thursday, April 2, a visit will be paid to the Royal Arsenal, Woolwich, when the principal shops of the Royal Ordnance Factories will be visited.

BRITISH EMPIRE GAS EXHIBIT, 1925.

List of Subscriptions promised to date.

	£	s.	d.
Aberdeen	50	0	0
Aberkenfig	6	0	0
Abergavenny	5	0	0
Abingdon	5	0	0
Aldershot	105	0	0
Adlington	3	0	0
Airdrie	10	0	0
Alnwick	3	0	0
Andover	10	0	0
Atherstone	5	0	0
Bagnalstown	0	9	0
Barnsley	39	0	0
Bath	200	0	0
Bedford	40	0	0
Berkhamsted	5	0	0
Birmingham	1,000	0	0
Blandford	3	0	0
Blackburn	145	0	0
Blyth	25	0	0
Bolton	100	0	0
Bournemouth	250	0	0
Bradford	325	0	0
Brentwood	15	0	0
Bridgend	3	0	0
Bridgwater	16	0	0
Bridlington	31	0	0
Bristol	500	0	0
British Gas Light Co. (Hull, Norwich, &c.)	500	0	0
Brynmawr and Blaina	5	0	0
Caerphilly	25	0	0
Cahir	0	7	0
Callender	1	0	0
Camborne	5	0	0
Cambridge	105	0	0
Cardiff	250	0	0
Carlisle	60	0	0
Carnarvon	1	0	0
Carnoustie	6	0	0
Carrick-on-Suir	0	13	6
Castlecary	2	0	0
Cheltenham	75	0	0
Chertsey	10	0	0
Chester	60	0	0
Chesterfield	60	0	0
Chichester	10	0	0
Colne	35	0	0
Colville	6	0	0
Cork	25	0	0
Corbridge	3	0	0
Corsham	1	0	0
Cromer	5	0	0
Darlington	90	0	0
Dawlish	3	0	0
Deal	21	0	0
Desborough	5	0	0
Doncaster	50	0	0
Dorking	10	0	0
Dover	25	0	0
Dumbarton	15	0	0
Durham	12	0	0
Eastbourne	52	0	0
Edinburgh	262	0	0
Elsecar	3	0	0
Exeter	100	0	0
Exmouth	16	0	0
Falkirk	25	0	0
Faversham	12	0	0
Felixstowe	5	0	0
Fermoy	1	10	0
Glasgow	1,410	0	0
Gloucester	85	0	0
Gravesend	20	0	0
Grays and Tilbury	40	0	0
Great Torrington	1	0	0
Greenock	50	0	0
Guernsey	10	0	0
Guildford	25	0	0
Halifax	105	0	0
Hampton Court	57	0	0
Harwich	5	0	0
Hastings	75	0	0
Hereford	10	0	0
Hessle	10	10	0
Herne Bay	15	0	0
Hexham	10	0	0
Haywood	10	0	0
Hitchin	10	0	0
Ilfracombe	25	0	0
Ilminster	5	0	0
Ipswich	125	0	0
Irthlingborough	6	0	0
Jersey	10	0	0
Keswick	5	0	0
Kilkenny	3	15	0
Kirkcaldy	10	0	0
London District—			
Brentford	1,000	0	0
Commercial	500	0	0
Croydon	500	0	0
Gas Light & Coke Co.	5,500	0	0
Hornsey	50	0	0
London District (*continued*)—	£	s.	d.
Lea Bridge	35	0	0
South Metropolitan	2,475	0	0
South Suburban	525	0	0
Tottenham	500	0	0
Wandsworth	500	0	0
Launceston	3	0	0
Leamington	50	0	0
Ledbury	3	0	0
Leicester	400	0	0
Lewes	5	0	0
Lichfield	10	0	0
Littlehampton	10	0	0
Lismore	0	10	0
Liverpool	915	0	0
Long Eaton	50	0	0
Longford	1	0	0
Loswithiel	1	0	0
Luton	90	0	0
Lytham	25	0	0
Maidstone	65	0	0
Magherafelt	0	8	0
Market Weighton	1	0	0
Middlesbrough	100	0	0
Mountmellick	0	8	0
Newcastle	500	0	0
Newport (I. of W.)	12	0	0
Newport (Mon.)	75	0	0
Northampton	100	0	0
North Walsham	1	0	0
Oakham	2	0	0
Ormskirk	10	0	0
Oswestry	5	0	0
Oxford	75	0	0
Padstow	1	0	0
Penrith	9	0	0
Peterborough	25	0	0
Plymouth	250	0	0
Portsmouth	328	0	0
Preston	125	0	0
Radcliffe	20	0	0
Ramsgate	25	0	0
Rathfriland	0	3	0
Reading	150	0	0
Redhill	45	0	0
Rochester	125	0	0
Romsey	5	0	0
Rugby	52	0	0
Ryde (I. of W.)	25	0	0
St. Albans	33	0	0
St. Austell	5	0	0
St. Helens	50	0	0
St. Ives (Hunts)	2	0	0
St. Neots	3	0	0
Seaham Harbour	13	0	0
Sedgley	10	0	0
Shanklin	7	0	0
Sheffield	650	0	0
Sheringham	5	0	0
Shrewsbury	40	0	0
Silsden	4	0	0
Solihull	7	7	0
Southampton	175	0	0
Southend-on-Sea	50	0	0
South Shields	50	0	0
Spennymoor	12	0	0
Stratford-on-Avon	10	0	0
Stroud	28	0	0
Sunderland	250	0	0
Thirsk	3	0	0
Thurles	1	10	0
Tipperary	1	15	0
Tonbridge	30	0	0
Torquay	50	0	0
Truro	8	0	0
Tunbridge Wells	65	0	0
Waltham Cross	10	0	0
Walton-on-Thames	20	0	0
Warminster	3	0	0
Warrenpoint	0	9	0
Warwick	15	0	0
Waterford	8	8	0
Watford	40	0	0
Wellingborough	50	0	0
Wellington (Salop)	20	0	0
Wells (Som.)	6	0	0
Westgate	11	0	0
West Hartlepool	75	0	0
Westward Ho	0	10	0
Weston-super-Mare	30	0	0
Whetstone	5	0	0
Wicklow	0	15	0
Winchester	25	0	0
Wisbech	10	0	0
Wivelscombe	1	0	0
Wolverhampton	150	0	0
Worksop	10	0	0
York	105	0	0
Society of British Gas Industries (estimated)	6,000	0	0
	£30,436	7	0

[Attention is called to the appeal made by the Executive Chairman, which was reprinted in the "JOURNAL" for March 4, p 521; also to the first Editorial in this issue.]

NATIONAL GAS COUNCIL.

Central Executive Board Meeting.

The Central Executive Board of the National Gas Council met on Tuesday, March 10, at No. 28, Grosvenor Gardens, S.W.—Mr. D. MILNE WATSON in the chair.

BUST OF MURDOCH.

The Chairman reported that Mr. L. E. Clift, Chairman of the Redditch Gas Company, had presented the Council with a life-size bust of William Murdoch, for exhibition in the Board Room at Grosvenor Gardens. The thanks and appreciation of the Board were conveyed to Mr. Clift for this gift.

BRITISH EMPIRE EXHIBITION.

It was reported that the Council had received a medal in commemoration of their participation in the British Empire Exhibition, 1924. The certificate which is to accompany the medal has not yet been completed, but will be forwarded shortly.

ELECTRICITY.—SUGGESTED GOVERNMENT SUBSIDY.

Resolutions were read which had been passed by various Commercial Sections and District Associations and Institutions of Gas Engineers and Managers throughout the country, with regard to the statements which had been made in the Press as to the proposed Government Grant to the electrical industry. The steps taken by the Council with regard to this matter were detailed; and after full discussion it was agreed to leave the matter to a Committee for the purpose of watching the position and safeguarding the interests of the industry.

GOOLE URBAN DISTRICT COUNCIL.

It was reported that the above Council had applied in the ordinary course to the Ministry of Health for sanction to borrow the necessary money in connection with the extension of carbonizing plant and purifiers at their gas-works, including the installation of electric generating plant. It has since been learnt that the Ministry of Health consulted the Electricity Commissioners upon the subject, and that the latter body advised that the Urban District Council should take its current from an electricity supply company. The Urban District Council have protested against this suggestion, and the Central Executive Board agreed that the intervention of the Electricity Commissioners in a matter of this kind was undesirable, and should be resisted.

POLLUTION OF RIVERS.

A resolution passed at the sixth annual meeting of the National Association of Fishery Boards was referred to, the effect of which was that Local Authorities should be recommended to use non-toxic material or bitumen instead of tar in dressing the roads, for the purpose of preventing the pollution of rivers.

Reference was also made to a circular recently issued by the Ministry of Transport, and calculated to promote the use of bitumen as a road dressing in place of tar.

The Central Executive Board resolved that the Council should send out a circular to all highway authorities, emphasizing the fact that the Interim Report of the Joint Committee of the Ministry of Transport and the Ministry of Agriculture and Fisheries itself alleged that the washings from tarred roads were only harmful to fish life when they drained *directly* from such roads into fishing waters. It was reported that the Council had again pressed the Ministry of Agriculture and Fisheries for a date upon which they might expect to receive the promised Report of the Joint Fisheries Transport Committee with regard to washings from tarred roads, but had been told that this would not be published before May next.

In accordance with the resolution passed at the last meeting of the Board, it was reported that space had been acquired at the British Empire Exhibition, 1925, in the Chemical Section of the Palace of Industries for an exhibit in connection with tar and tar compounds.

ROADS IMPROVEMENT BILL.

It was reported that this Bill was down for second reading that day, and that under its provisions the Minister takes power to conduct experiments or trials for the improvement of the construction of roads or for testing the effect of various classes of vehicles on various types of road. The Bill, as drafted, contained no clause for the protection of the owners of pipes placed in the subsoil which might be injured by such experiments; and it was resolved that steps should be taken to ensure, if possible, the insertion of the necessary amendments at the committee stage.

SURREY COUNTY COUNCIL BILL.

The Board approved the action taken by the Council in supporting a petition against this Bill, the effect of which, as originally drafted, might have enabled the County Council to exercise pressure upon local authorities to use bituminous substances *in lieu* of tar in the case of certain roads. The County Council had agreed to amend the Bill somewhat; and it was now thought that the interests of tar producers in this respect had been safeguarded.

UCKFIELD GAS COMPANY.

It was reported that the East Sussex County Council were

endeavouring to obtain the insertion of protective clauses in their favour in a Bill promoted by the above Gas Company—clauses which, if agreed, would create precedents likely seriously to affect the gas industry. The Board approved of the Council's assisting the Gas Company, in view of the importance of the matter to the gas industry as a whole.

Public Utility Companies (Capital Issues) Act, 1920.

It was reported that, in accordance with the resolution passed at the last meeting of the Board, the opinion of the Rt. Hon. H. P. M'Millan, K.C., had been obtained with regard to this Act. It was resolved that the gist of Counsel's opinion should be forwarded to the companies concerned, and that they should be advised to consult their legal advisers as to their individual position after the expiration of the Act.

Gas Regulation Act, 1920.

It was reported that a conference of representatives of municipal and other local authorities owning gas-works, who had not yet obtained an Order under section 1 of the Gas Regulation Act, was held on Feb. 24—Alderman F. S. Phillips presiding, supported by Alderman J. H. Lloyd—and that after fully debating the matter, the conference had passed the following resolution:

> "That this representative meeting of municipalities and other local authorities owning gas-works hopes that the Board of Trade will not enforce the Gas Regulation Act, but leave its adoption to the voluntary action of such municipalities and other local authorities."

Representatives from Salford, Birmingham, Bradford, Warrington, Tyldesley, Torquay, and Stafford were appointed by the conference to attend the Board of Trade on the following day. The deputation was received by Mr. Percy Ashley, Principal Secretary, and Mr. H. C. Honey, Director of Gas Administration; and a full report appeared in the Technical Press. There was no definite decision as a result of the conference, but Mr. Ashley said that the matter would have to receive the very careful consideration of the Board of Trade.

A letter was read from the Secretary for the Scottish District of the Council, who had not had an opportunity of placing the views of the Scottish municipalities before the Board of Trade; and it was agreed that there was no objection to this being done when a suitable opportunity arose.

Rating of Machinery.

It was reported that the Report of the Inter-Departmental Committee on the Rating of Machinery and Plant in England and Scotland was issued on Feb. 6. The Committee, while recommending that machinery should, to a certain extent, be relieved from rating, suggest that "special properties" (including gas undertakings) should not enjoy any relief.

The Board adopted the recommendations of the Committee of the Council which is dealing with the matter, including the following:

(1) That the attention of the Central Executive Board be drawn to p. 22 of the Report of the Departmental Committee, which proposed that "special properties" should be specifically excluded from the scope of the Committee's proposals for granting partial relief to Class II. machinery and plant. This would affect the incidence of rating, so that "special properties" and domestic premises would have to pay higher rates in the pound in order to make up the deficit which otherwise would accrue from the fact that partial relief was given in respect of Class II. machinery and plant.

(2) That the Departmental Committee, however, had made Class I. so all-embracing, and left so little for Class II., as far as gas undertakings were concerned, that further representations from the gas industry were not recommended; but it was suggested that the officers of the Council should see the Ministry, and stress the Minority Report, and that a letter of protest be written, pointing out that the proposals of the Departmental Committee would throw an additional burden upon other ratepayers.

Electricity Prospectuses.

A letter was reported from a Gas Company, calling the attention of the Council to the broadcast circularization of gas shareholders with "prospectuses" and "offers for sale" of shares in gas and electricity companies. This matter has already received the attention of the Press, and of the Technical Press in particular. It was agreed to bring up this matter again at the next meeting, by which time the officers would be able to bring forward definite recommendations on the subject.

Standard Gas Cookers.

At the last meeting of the Board, mention was made of the rates of discount which the Council expected to obtain off the original net prices of standard cookers, for orders in large quantities. The Council were now able to report that, as a result of subsequent negotiations, both the Parkinson Stove Company, Ltd., and Messrs. R. & A. Main, Ltd., were prepared to agree to grant discounts in excess of those mentioned at the last meeting in respect of orders placed by members of the Council collectively.

For orders amounting in the aggregate to not less than 500 cookers during twelve months	A discount of 7½ p.c. off the original net prices.
Ditto 2000 . . . do.	Ditto 10 p.c.
Ditto 5000 . . . do.	Ditto 12½ p.c.

Net cash, monthly account, carriage paid.

The quantities referred to relate to the aggregate number of cookers ordered from each firm, and the discounts quoted are subject to the stipulation that the makers are advised, on the placing of the order, of the rate at which delivery will be taken throughout the twelve months.

It is appreciated that in many cases it may be difficult for an undertaking to give their monthly requirements in advance. In such cases members are being asked to group together periods of not more than three months, and to indicate the quantities which the undertaking will be prepared to take during each of such periods.

Chemical Works Regulations, 1922.

A communication from the Home Office was reported, to the effect that it was expected within the next fortnight that Certificates of Exemption from some of the above regulations would be issued to all gas-works on whose behalf the Council had appealed. It was agreed that the Board should authorize the officers to accept the Exemption Certificates and instructions if they thought them satisfactory to the indusry, but that if any doubt existed as to the reasonableness of such Certificates, the Committee already appointed by the Board to deal with this matter should be called to consider the question.

Annual Meeting.

It was agreed that the annual meeting of the National Gas Council should be held on Tuesday, May 26.

April Meeting of the Central Executive Board.

It was agreed that, in view of the fact that the second Tuesday of the month would fall on April 14—*i.e.*, the day following Bank Holiday—the April meeting of the Central Executive Board should be held on the first Tuesday of that month—viz., April 7.

Oxidation of Coal at Storage Temperatures.

A paper on this subject submitted by Messrs. S. W. Parr and R. T. Milner to the Section of Gas and Fuel Chemistry of the American Chemical Society, discusses the following questions: (1) What is the limit of oxygen absorption; is there a saturation point? (2) What effect has temperature upon the extent and rate of oxygen absorption? (3) What are the governing factors and the attending phenomena—such as increase in weight, loss of heat units, formation of secondary products, and building-up of the heat increments? The Illinois coals studied showed an increase in weight throughout the period—seemingly approaching a saturation-point at about 8 p.ct. of the original weight. Moisture equivalent to from 4 to 8 p.ct. of the weight of the sample was evolved, varying in equivalent to from 2 to 6 p.ct. of the sample. As a result of their investigation, the authors think there is ground for the conclusion that oxygen is taken into the coal texture primarily in an adsorbed or surface condensation form. In this stage its presence is indicated by an increase in weight of the mass, and the loss in heat units corresponds to this weight increment; hence the heat loss is apparent, and not real. But at slightly elevated temperatures, the adsorbed oxygen goes over into actual chemical combination, with the evolution of water and carbon dioxide. Here there is an actual loss of heat, practically equivalent in amount to the heat of combustion represented by the weight of carbon and hydrogen in the water and carbon dioxide evolved.

"Columbus" Coke Separator at Springfield.

There has lately been installed at the works of the Springfield (Mass.) Gas Light Company a "Columbus" coke separator, the arrangement of which is of particular interest because it was possible to adapt the plant to existing conditions with a minimum of alteration. Previously it appears (from an account given by Mr. C. M. Walker, the Springfield Gas Company's Chemist, in the pages of the "Gas Age-Record") the ashes and clinker were elevated by a hoist to the top of the water gas generator house and dumped into a hopper, from which they were fed into a large revolving screen. The intention was to utilize the large-size ash as fuel; but the plan did not work-out well because there was, of course, no separation of the clinker and the unburned coke, so that all the large-size stuff had to be used together. Upon its being decided to instal the coke separator, it was found that the machine selected would go well into the space occupied by the revolving screen, which would no longer be necessary. Exhaust steam coils are provided to prevent freezing in winter. The fluid prepared for the separation process is brought up to the required specific gravity by the addition of spent lime. A test made on ashes taken from above the grates of the water gas generator showed 47·3 p.ct. of the total weight of ashes on the dry basis recovered as coke. The amount of coke reclaimed daily from the water gas generator ash is 2 tons, or 730 tons per annum. The yearly value of this coke, at $8 a ton, amounts to $5840. The annual operating cost comes out at $2670; so that there is a net yearly saving on the plant of $3170. Taking the combined cost of machinery and installation at $3500, it will be seen that, at the present rate of gas output and ash production, the "Columbus" separator will pay for itself in a little over a year. As the daily send-out of gas increases, the saving due to the reclamation of the coke from the ashes will naturally increase proportionately.

UP-TO-DATE OXFORD.

[Reprinted from "The Isis" by Permission of the Editor.]

Strange, that no undergraduate seems thankful! Stranger still, perhaps, that wherever two or three dons are gathered together gratitude is not found among them! Yet the monotonous comb-toothed skyline of Oxford has of late been changed into a thing of beauty by an addition as difficult to overpraise as to overlook.

Consider the new gasometer.* Whether it is first seen from Boars' Hill or Port Meadow, from Headington or Cumnor Hurst, or even from the railway, it now rises supreme among the spires and towers of Oxford, and dwarfs them all. So Oxford at last takes its place as a modern city; and the builders of antiquity, with their bride-like Gothic or pudding-bowl Palladian, are henceforward put in the shade. Our engineers have blown this enormous bubble of iron for our delight, and with gossamer filaments of steel have anchored it to earth. Big industrial towns may have such things, but gloomy warehouses and smoking factories hide them. Only in Oxford, with its clear rain-washed atmosphere, and its background of carved or crumbling stone as a foil, can the simple stark beauty of a gasometer be enjoyed to the full. Truly, "earth hath not anything to show more fair;" and one grows hot with indignation to think that this masterpiece of cubism—or, more precisely, cylinderism—cannot be seen from the High, simply because some mouldering college or other is still permitted to block the view.

But apart from its intrinsic comeliness of line and mass, it also possesses that mysterious type of beauty which appeals, perhaps most, to the poetic imagination. One of the sanest of our younger poets owns to having been profoundly moved when, from Elsfield, one afternoon this term, he saw its vast level top, new-painted, glowing in the sun—he said—"like a lake of gold lifted high above the city, than which the hanging gardens of old Babylon could not have looked more lovely." While another, not more mad, has reported that, one evening, when walking home from Iffley along the towpath, he saw it for the first time beyond the flooded meadows, looming immense and lonely against the dying light of the west, like some dark tower of Faerie, topped with impossible aerials for communication with the stars.

Unlike some beautiful objects, however, it will also stand, and repay, a scrutiny at close quarters. A few minutes' walk to Folly Bridge and thence along the towpath up-stream, brings one within its very shadow. And there, with a catch of the breath, one sees it heaving up its vastness until the top of it reaches to Heaven itself—a dancing-floor for the angels. Such, indeed, is its huge and impassive bulk that, gazing up at it, one feels oneself somehow shrinking and shrinking, until the inherent littleness of humanity overwhelms the mind (a salutary experience for swelled heads and high brows), while, at the same time, the fundamental rightness of the thing, its honesty of purpose, its total lack of humbug or pretence to be other than it is, exert a moral influence comparable only to its magnitude.

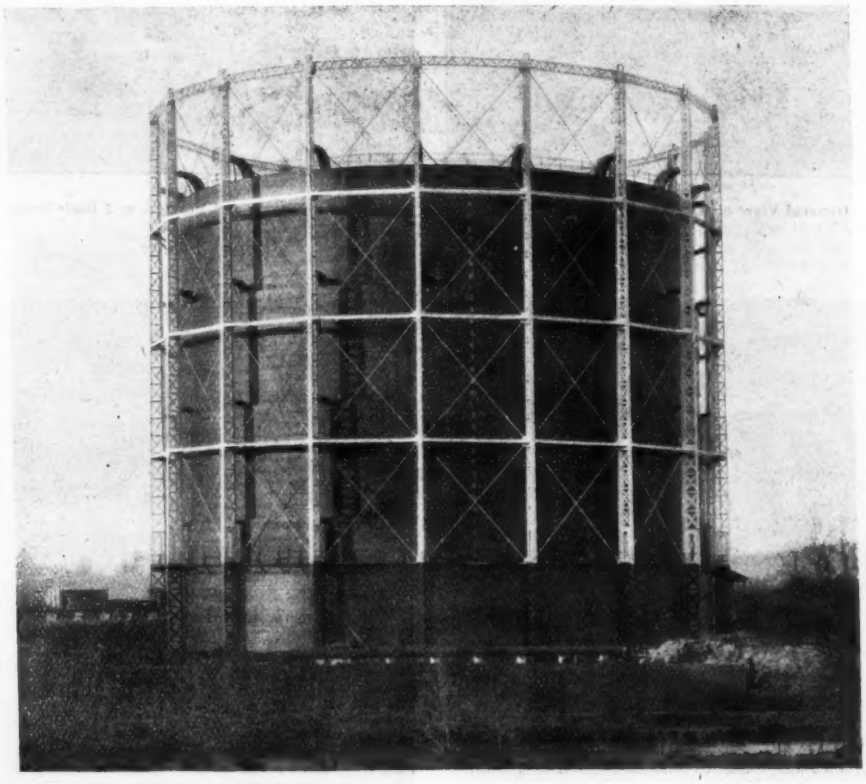
To the spiritually-minded, likewise, this pilgrimage would not be entirely without edification. For even if they should be unable to appreciate its greatness as a work of art, or to realize their own insignificance, they at least cannot fail to regard this marvellous structure with adoration and awe as being divinely inspired, if not indeed expressly created, by the words: "Let there be light"—which words, the next eminent Scottish theologian who brings out a Bible-up-to-date will probably translate more truthfully as: "Let there be gasometers." And if, on second thoughts, they grow perturbed because the light is so completely hidden under the bushel, they may reassure themselves with the reflection that, after all, this particular bushel is of such a size as to attract more attention to good works than is possible for a mere light to do nowadays.

From the foregoing, then, the erection of the new gasometer is seen to be justified on the grounds of æsthetics, morality, and religion. Nevertheless, it must stand condemned from the purely utilitarian point of view. Even if there has of recent years been a shortage of gas in Oxford—which is doubtful in the extreme—this shortage could easily have been met by a very slight increase in the output of the Lecture Rooms, the Union, and other places unspecified, not to mention the pulpits of the numerous churches and chapels; and, obviously, with much less expense. And since the City Fathers, or the Gas Company, or whoever is responsible for such a deplorable and wholly unnecessary expenditure of money, have not been publicly damned for their wastefulness, by—

(*a*) the Slade Professor, who lectures us on the Fine Arts;
(*b*) the Professor of Poetry, who encourages us to practise what he only professes;
(*c*) the Proctors, who look after our morals;
(*d*) the Bishop of Oxford, who is there to save our souls;

it can only be supposed that these, and other Oxford lights of learning and culture, are more than satisfied with the diverse effects of the new gasometer in their own particular departments of thought and life. That is why they have made no protest early or late. And that is why everybody else is, or should be, full of gratitude to them. For what we have received, and are only too likely to receive in the future, may the Lord make us truly thankful. Amen. N. A.

* The holder referred to in this article was constructed and erected by Messrs. C. & W. Walker, Ltd., under the Engineer to the Oxford Gas Company, Mr. W. E. Caton.



THE GASHOLDER WHICH IS JUSTIFIED ON THE GROUNDS OF ÆSTHETICS, MORALITY, AND RELIGION.

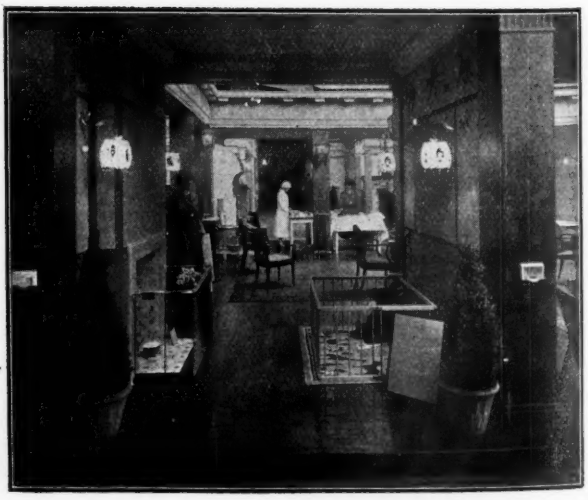
GAS AT THE IDEAL HOME EXHIBITION.

LONDON GAS EXHIBIT—MAIN ENTRANCE TO STAND.

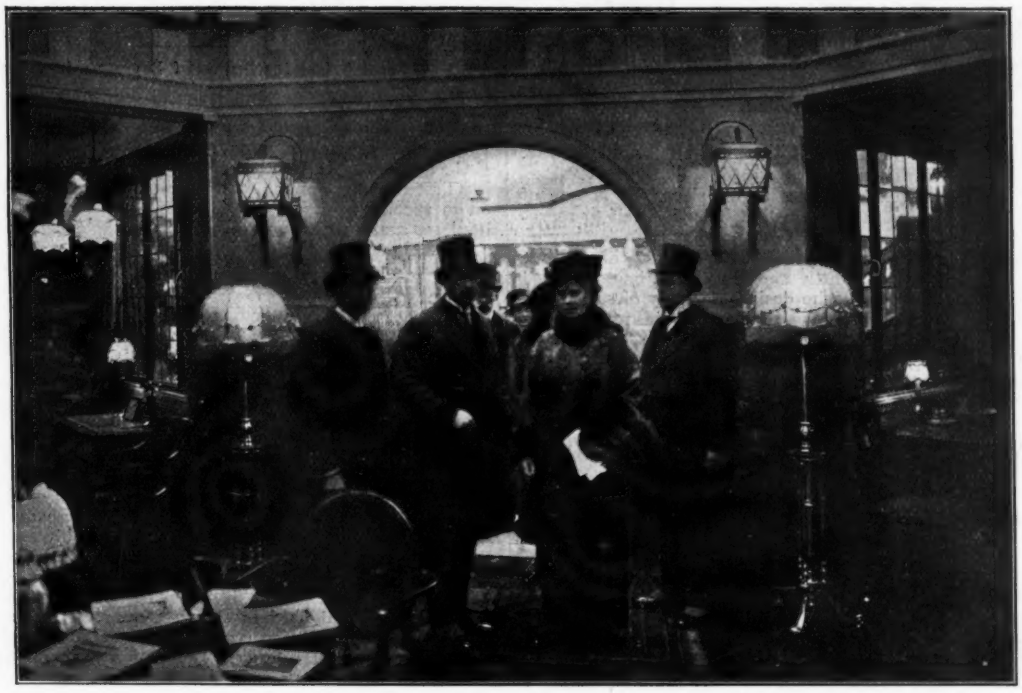
General View of the Stand.

Study and Lounge, and Bath Room beyond.

View through Bedroom, Lounge, and Bathroom.



View through Nursery, Lounge, and Kitchen Scullery



A VISIT BY HER MAJESTY THE QUEEN.

GAS IN A TELFORD ALL-STEEL HOUSE.

Photos taken in one of a pair of "Telford All-Steel" houses erected by Messrs. Braithwaite and Co., Engineers, Ltd., of Victoria Street, London, S.W., and equipped by the South Metropolitan Gas Company with the complete "Metro" gas home service. The living room has a 3-light pendant in oxidized copper, fitted with 25-c.p. No. 1 "Metro" burners, switch controlled, and silica globes, and a table lamp in oxidized copper with a "Metro" 25 c.p. burner and effective silk shade. Warmth is provided by a "Metro" gas-fire (No. 66), controlled by a standard tap with removable key. A useful adjunct is a smokers' companion consisting of wall bracket, ash-tray, and pilot light; the latter having sufficient tubing to allow of its being used to light the fire. "Metro" service in the kitchen-scullery provides for cooking, wash boiling, and ironing. The sink is supplied with hot water by the gas-heated hot water circulator in the adjoining bathroom. The room is lighted by a 75-c.p. "Metro" burner, fitted with a bowl. Our illustration shows the details of the gas installation. The pilot light attached to the "Metro" cooker provides an ever-ready means of igniting the gas in oven or on hotplates, and burns no more than a therm in 1000 hours.

OTHER STANDS OF INTEREST.

(*Concluded from p.* 605.)

Smaller Water Heaters.

The large number of wash boilers and appliances of this kind heated by gas, points to a growing appreciation of the merits of this convenient fuel for water heating purposes.

Among others were noticed the "Pulsator" automatic washing machine—operated by a small gas ring. In this machine the hot, soapy water is forced-up through the clothes, and then back again, every few seconds. Also operated by a gas ring is the "Wonder" washer. As the water boils, it rushes up tubes at either side into the top distributor, and percolates back through the clothes again and again, with a continuous suction action. For the "Thermecon" wash coppers economy in gas consumption and great durability are claimed.

Express Boilers, Ltd., of No. 63, Great Portland Street, London, W., have produced a domestic water boiler which is not a geyser but will give boiling water in 17 seconds. It is explained that the reason for the rapidity of the "Express" boiler lies in the new system of coiling. The water enters at the top of the coil, and passes downwards towards the flame. The coil and burner can be taken out and replaced in less than a minute. Small and compact, and attractively made in copper, the "Express" boiler may be placed anywhere that is most convenient. Indeed, it is suitable for places where some other forms of heater cannot be used.

"Solignum."

The object of a well-arranged exhibit by Messrs. Major & Co., Ltd., of No. 205, Borough High Street, London, S.E., it to demonstrate the various uses of "Solignum" wood preserving stain. In a characteristic setting is shown a section of a house, with garden, fencing, &c. All woodwork throughout is stained and preserved with "Solignum" in various shades. Special features are specimens of wood-destroying fungus and an illustration of how, by the use of "Solignum,"

the hidden woodwork of any building can be made immune from attack by dry rot or other forms of decay.

The Leeds Fireclay Company, Ltd., of Wortley, Leeds, make a good display of "ideal ware for the ideal home."

Water Softening.

A large stand in the centre of the main hall is devoted by United Water Softeners, Ltd., of Imperial House, Kingsway, London, W.C., to a display of working installations of "Permutit" household water softeners in all sizes. It is one of the great advantages of the system that it lends itself to reproductions on any scale, small or large; so that the person who merely desires to soften his drinking water can do this with a "Midget Softener" costing little and capable of being carried in the handbag. The woman who desires a supply of soft water for toilet purposes need not invest more than a few pounds for a lavatory basin fixture; while the householder who wants soft water for all purposes, including baths and hot water service, is catered for at a comparatively modest outlay. This softener consists of a closed cylinder containing the indestructible water softening substance called "Permutit." There is no mechanism to adjust; and no lime or other chemical is required.

CONFORMAL REPRESENTATION.*

Reviewed by Dr. G. E. Foxwell.

This book is described in the translator's preface as "intended for students of applied mathematics, physics, and mapping who are not intimately acquainted with the theory of functions." This is a satisfactory description of the scope of the book—much more so than the publisher's announcement on the cover to the effect that the treatise is designed to meet the needs of mathematicians, physicists, and engineers, and does not require a very advanced knowledge of mathematics. The reader should certainly have a good knowledge of the mathematics of imaginary quantities, and particularly of the properties of complex quantities and of their geometrical representation. Ability to solve differential equations and some knowledge of the theory of functions are demanded.

The treatment given in the first chapter consists of a condensed statement of the principal facts concerning the geometrical representation of complex quantities which, unless previously known to the reader, will leave him mystified. In the reviewer's opinion, this chapter sets the key-note of the whole treatise. Just what constitutes an advanced knowledge of mathematics, it is not easy to say. It depends much on the individual. It is not many years ago since knowledge of the calculus, for example, was confined to those who would be considered as possessing an advanced knowledge; to-day the more elementary portions are taught in the higher forms of schools. Consequently the value of such a book as the one under review depends largely on the age and training of the reader.

The subject of conformal representation is of great importance in any consideration of the theory of functions; and in the writer's opinion this book should be particularly valuable to the mathematical student, as the treatment is distinctly clearer than that of the standard treatises. The student is accustomed to work up to the proof of the Cauchy-Riemann theorem; and the alternative method here adopted of assuming the theorem as proved, and making use of it to deduce other results, while not mathematically sound from a purist's point of view, nevertheless has a particular advantage to the student in enabling him to "see round the corner," and so gives him just that extra insight which enables the study of the subject by the standard methods to be undertaken with less labour and greater prospect of success.

The readers of the "Journal," however, will be more interested in the matter from a practical point of view. Of what use is the book to them in their daily work? The question is a fair one; and in the opinion of the reviewer the book is not likely to benefit the gas engineer directly. Very few—probably no—gas engineers have ever studied the subject; and unless the reader has some prior knowledge, the book is not likely to be helpful. There is an entire absence of treatment of practical application. There is no indication given as to how any portion of the somewhat abstruse mathematics of conformal representation can be applied to the solution of any practical problem. The book is one for the mathematician and possibly the geographer, but not for the gas engineer.

* "Conformal Representation," by Leo Lewent. Translated by R. Jones, M.A., D.Sc., and D. H. Williams, B.Sc. Published by Messrs. Methuen; price 7s. 6d. net.

City of Leicester Traffic Lighting.—We are informed by Mr. W. J. Liberty, the Hon. Secretary of the Institution of Public Lighting Engineers, that, in order to assist in the traffic control of one of the main roads in Leicester, the Superintendent of Public Lighting, Mr. Thomas Wilkie, acting on the instructions of the Lighting Committee, is erecting a spot-lighting apparatus. The light will be projected from a pole 30 ft. high, and the beam focussed on the pointsman on duty.

COMMERCIAL ROAD TRANSPORT.

Paper before Institution of Engineers-in-Charge.

The progress of mechanical road transport was dealt with from various points of view by Mr. G. F. Sharp, in a paper which he read on Wednesday, Feb. 11, at St. Bride's Institute, E.C., before the Institution of Engineers-in-Charge. Considering first the effect of the war on mechanical transport, he went on to speak of passenger traffic development, and then of the haulage and conveyance of goods.

Here, it seems, the developments have been away from the 4-tonner, which dominated the situation throughout the war. There are now two strong tendencies—one towards the vehicle capable of carrying a 10 or 12 ton load, and the other towards the light, fast vehicle on pneumatic tyres, with a load capacity of 2 tons or even less. It was pointed out by the author that the reason for this at first sight curious divergence is to be found in the desire to attain economy and efficiency. There is reason to believe that, of the 204,000 commercial goods vehicles, about 55 p.ct. are of 1-ton capacity or less.

An Interesting Calculation.

Pursuing this branch of his subject, Mr. Sharp discussed the total carrying power of the commercial motors of this country. He said that, of the 204,000 goods vehicles already mentioned, 4000 road locomotives and tractors, and probably 20,000 vehicles taxed on horse power or as motor cycles and run for trade purposes, a small proportion is not in use for the whole year; but this, in all probability, is balanced by those vehicles which are registered and used in the first quarters of the year, but which, not being on the road in the last quarter, are not included in the annual figure. Except at very great cost for clerical labour, the exact figures cannot be arrived at. To all intents and purposes, however, the figures quoted are very close to accuracy. It is fair to consider that an average day's work for vehicles is 4 tons moved and for haulage machines 6 tons, and that the average distances covered per week are 250 miles for the vehicles and 100 miles for the haulage machines. These figures are on the conservative side, and can safely be accepted, with 280 as the working days of the year. On this basis, each vehicle moves 1120 tons a year, and each machine hauls 1680 tons per annum; and one gets a total tonnage moved on the road in a year of 357,000,000, while in live mileage (eliminating, that is, dead running) the vehicles travelled 2,820,000,000 miles. By comparison, the railways of Great Britain in the year carried 342,995,000 tons of goods and mineral traffic. The average length of haul of all descriptions of goods on the railways is nearly 52 miles—that for general merchandise being 82¾ miles, and for coal, coke, and fuel nearly 43 miles. There are no data by which one can arrive at the average length of haul of commercial motors.

Specific Development.

The caterpillar or creeper-track mode of propulsion is, the author stated, making distinct headway. So far as civilian purposes are concerned, it can best be made use of in exploration and in pioneering. A machine weighing 4 tons can haul a load of 5 tons over moderately bad cross-country, and will pull 4 tons up a gradient of 1 in 3½; while, equipped as it should be with a winding drum and cable scotches for its wheels, it can climb a gradient of 1 in 1, be anchored by the scotches, and then haul-up its load after it. The original difficulty in creeper-track machines lay in the rapid wear of the tracks. Post-war productions are the Kegresse band of vulcanized rubber and fabric, and the track with articulated and well-lubricated joints now being exploited by Roadless Traction, Ltd. This has been applied on the Guy 1-ton chassis, Sentinel 6-ton steam tractor chassis, and other types. A distance of 3000 miles is recorded as having been covered by one pair of Kegresse bands, without signs of undue wear being shown. There has also been developed for the negotiation of rough and sandy country the six-wheeled lorry (each wheel having twin tyres) of the Renault Company, of Paris.

The "Sentinel" steam vehicle chassis is, declared Mr. Sharp, one of the most successful of the day, and it is produced in large quantities. It has set the fashion in engine position, which is below frame level, giving the advantage of direct drive to the differential. It has a very efficient boiler, capable of withstanding a hydraulic pressure of over 1000 lbs. to the square inch, the normal test being 350 lbs. The Atkinson steamer can now be obtained equipped with a two-speed epicyclic gear for hilly country, with a free engine position between the direct and indirect gears. The steam tractor capable of hauling heavy loads has no rival in the field of the internal combustion engine; 12 tons being as much as the petrol-driven trailer is calculated to manage.

Before closing his paper, the author laid emphasis on the need for reducing road wear, and expressed himself a firm advocate of carrying the load upon more than four wheels.

Modern Developments of Gas Production.—At an informal meeting of the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, at 7 o'clock on Friday, April 3, there is to be a discussion on "Modern Developments of Gas Production."

MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

ANNUAL GENERAL MEETING.

THE Annual General Meeting of the Association took place in the Grand Hotel, Birmingham, on Thursday last. In the absence of Mr. C. H. Carder (late of Oldbury, and now of Rio de Janeiro), the chair was taken at the opening of the proceedings by Mr. P. N. LANGFORD, of Coventry, who subsequently gave place to the new President, Mr. W. E. CATON, of Oxford. In addition to Mr. Caton's Presidential Address, a paper on "The Education of the Gasfitter" was submitted by Mr. R. J. ROGERS, of Birmingham. The large attendance included Mr. J. Ferguson Bell (the President of the Institution of Gas Engineers), Mr. W. M. Mason (the Manager of the British Commercial Gas Association), and Mr. James Eldridge (Mr. Caton's predecessor at Oxford).

A LOSS TO THE ASSOCIATION.

Mr. P. N. LANGFORD said that, before they commenced the business of the day, he would like to refer to the loss the Association had sustained since the last meeting through the death of Mr. Thomas Watson, of Rushden. He had been a member for a number of years, and was a regular attendant at their meetings. It would, he was sure, be the desire of those present that a letter of condolence should be sent to the relatives. The members signified agreement with this by rising silently in their places.

The minutes of the last meeting were then read and confirmed, after which the HON. SECRETARY (Mr. T. Thornton, of Rowley Regis) read a number of apologies for absence from Presidents and Secretaries of kindred Associations.

NEW MEMBERS.

The following new members were elected:

Mr. Richard Ashworth, of Tamworth.
Mr. Percy William Dillamore, of Witney.
Mr. Rowland Fisher, of Litchurch, Derby.
Mr. John Rollinson Hollies, of Kidsgrove.
Mr. John Paul M'Crae, of Derby.

WEMBLEY.

Mr. LANGFORD said he understood Mr. Mason would like to say a few words to them, and he had pleasure in calling upon him.

Mr. W. M. MASON, after alluding to the importance of the forthcoming "B.C.G.A." District Conference at Leicester, said he desired to draw attention to the part that gas was to take at the Wembley Exhibition this year, and the support that was being accorded. He pointed out that Birmingham, as the leading undertaking in the Midlands, had put down £1000, which was very generous. Leicester had come in on the full basis, and others had promised—Sheffield, for one, was giving £650. An analysis of the inquiries made at Wembley last year showed that three to one of them came from places outside London, thus proving that the provinces were influenced and benefited by the display. It had to be remembered, too, that a very large proportion of the funds available for Wembley was spent in national publicity, on the same lines as the ordinary publicity carried on by the "B.C.G.A." That was to say, money was allocated to the various districts on the basis of the amounts that came in. These points should have some weight with Directors and Gas Committees when considering the advisability of subscribing; but even if no direct return could be shown from Wembley, the growing state of competition made the exhibit well worth while. Wembley afforded an opportunity for raising the flag, and for showing through publicity that gas was a very live industry. For this reason alone, the movement was worthy of support, especially from a progressive district like the Midlands. Even far-away Glasgow was again this year supporting on the full basis.

REPORT AND ACCOUNTS.—THE INSTITUTION BENEVOLENT FUND.

Mr. LANGFORD, moving the adoption of the forty-seventh annual report of the Committee and the accounts (including those of the Emergency Fund) for the year 1924, remarked that there was little in them which called for discussion.

Mr. HAROLD DAVIES (Chesterfield) said the accounts showed that they had a satisfactory balance in hand. He had recently had an opportunity of attending a meeting of the Committee of the Benevolent Fund of the Institution of Gas Engineers, and learned that in the next twelve months they would be paying out considerably more than last year's total income. Therefore they would be perfectly justified in considering whether it would be possible for them, as an Association, to contribute this year something towards the fund. He knew, of course, that many of the members subscribed individually.

Mr. J. FERGUSON BELL said he personally would feel very grateful if the Association could see their way to follow the lead of some of the others, by subscribing (say) £10 10s. to the Institution Benevolent Fund. Recently the Committee had been much more liberal in awarding relief in necessitous cases. It was realized that the sovereign was worth only about 12s. to-day, and this pressed very hardly upon those who were in want. Only that day he had sent a letter to the Secretary, of which they would all receive a copy, asking for increased support. The fund was doing an enormous amount of good work. The outgoings this year would be something like £600, while the present income was not more than £500. Unless, therefore, further support was forthcoming, it would be necessary to draw on the reserves or to reduce the grants.

Mr. W. G. S. CRANMER (Willenhall) said that, while he had every sympathy with the appeal, it seemed to him that a possible objection to the proposal that the Association should subscribe was that it might have a tendency to make some feel that there was no need for them to subscribe individually. If only a successful campaign could be carried out among the non-subscribers, the whole of the money needed could be easily raised. The Institution had a membership of about 1000, and an average subscription of 10s. 6d. a member per annum (in place of the 5s. at present) would bring in over £500 a year, giving the Committee, with the interest on investments, a yearly income of between £700 and £800.

Mr. R. S. RAMSDEN (Leamington) supported the proposal, and added that he thought most of the present subscribers could double their contributions without feeling the loss of the money.

Mr. HUBERT POOLEY remarked that it was sometimes difficult for one man to advise another as to what he should do, but he would earnestly appeal to members to give what they could afford. It was a most deserving object, and had in the past been wretchedly supported.

Mr. W. S. MORLAND (Gloucester) said, in view of the fact that the smallest sum would be thankfully received, it would be a good thing if every member could see his way to support the fund, even if only to the extent of 2s. 6d.

The report and accounts were adopted, and it was resolved unanimously that the Association should subscribe £10 10s. to the Institution Benevolent Fund.

COMMERCIAL ASSOCIATION.

Mr. B. W. SMITH (Walsall) as Chairman, next submitted the report of the Midland Commercial Gas Association for the year ended Dec. 31 last. They were, he said, most desirous that other members should join this section; the present number being only 58, out of a total of 109 members of the Association. With regard to coal, it was early yet to speak definitely of what prices would be, but he had heard of reductions of from 1s. to 3s. a ton. Oil was still very high—from 5½d. to 5¾d. per gallon. Coke had become a serious question for them all, in view of bad trade, falling off in exports, mild weather, and other conditions beyond their control; and there was a wish among members that they could get some relief from those who were loading coke into the various districts. In this matter, however, the section could do nothing; it must be left to individual members. Tar was a bad market, but sulphate had slightly improved. The Commercial Association were very anxious to supply the members with all possible information, and it was to be hoped there would be no reticence on the part of anyone in assisting those who were less well placed for ascertaining facts than themselves.

Mr. CATON seconded the adoption of the report, which was unanimously agreed to.

GOVERNMENT AND THE ELECTRICITY SUPPLY INDUSTRY.

Mr. LANGFORD said the following letter, dated March 7, had been received from Mr. William Rogerson, the Hon. Secretary of the Manchester District Institution of Gas Engineers:

> At the annual meeting of the Manchester District Institution of Gas Engineers, held in Manchester yesterday, I was instructed to forward to you the following resolution, which was passed unanimously:
>
> "Having regard to the national importance of the gas industry, and particularly to the service it renders in conserving the coal supplies of the country, this meeting views with concern the reported proposals of the Government for financial assistance for the electricity supply industry, and urges the National Gas Council to take such steps as will ensure the full consideration by the Government of the claims of the gas industry, and suggests that all undertakings should be advised at some opportune time to appeal for the support of Members of Parliament representing the districts within their area of supply."
>
> I was to express the wish that you would place this before your members at the next meeting, with a view to a similar resolution being passed, and that your members be requested to forward a copy of the same to their Member of Parliament for the district, asking him to give the matter his attention, with a view to protecting the interests of the gas consumers in their area of supply.

They would all agree that this question of the proposed sub-

sidizing of the electrical industry was very serious. He knew the National Gas Council were taking up the matter strongly, and in due course members would receive from them information on the subject. The best thing would be to adopt the resolution of the Manchester Institution, and he moved that this be done.

This was seconded by Mr. William Wilson (Burton-upon-Trent), supported by Mr. Pooley, and unanimously agreed to.

Representative on Institution Council.

On the proposition of Mr. Langford, seconded by Mr. W. H. Adams (Bilston), Mr. Caton was appointed as the representative of the Association on the Council of the Institution of Gas Engineers.

The New President.

Mr. Langford expressed the regret of all present that the retiring President, Mr. C. H. Carder, was unable to be with them; but he was certain that, in South America, he was thinking of them that afternoon. As his immediate predecessor, it became his (Mr. Langford's) privilege to induct formally to the chair their new President. He said "formally," because during

THE PRESIDENT.
Mr. W. E. Caton, of Oxford.

the past year, in the absence of Mr. Carder, their gatherings had been ably presided over by Mr. Caton, who had thus proved the wisdom of the Association in electing him President. Mr. Caton was keen in all that related to the welfare of the industry, and took great interest in the work of the Association. They all wished him a happy year of office.

Mr. W. E. Caton, of Oxford, who was cordially received, then took the chair, and moved a hearty vote of thanks to Mr. Carder, to whom they all wished happiness and prosperity.

Experiences in South America.

The President then read a letter which had been received by the Hon. Secretary from Mr. Carder. From this the following extracts are taken:

Rio de Janeiro Tramway, Light, and Power Company, Ltd.
Feb. 20, 1925.

Thanks very much for your cable advising me that the annual meeting of the Midland Association will be held on March 12. I hope that you will have as successful a meeting on this occasion as you seemed, from the Press reports, to have had in the autumn.

The papers read at that meeting were both of very great interest, and the figures given by Mr. Tooby of the results obtained at Coventry were particularly so, because they show how close an approximation is possible between the therm results obtainable from widely different types of plant operating under dissimilar conditions. Mr. G. C. Pearson, in the discussion, indicated that he was obtaining from Woodall-Duckham retorts a therm yield closely agreeing with those given by Mr. Tooby in Table I. of from 78 to 84 therms in gas per ton of moist coal; and it will perhaps be of interest to the members of the Association to know that, from modified Dessau verticals here, the results obtained are almost identical, all measurements being corrected to 0° C. and 760 mm., with the gas sent out at 495 B.Th.U. per c.ft. In Sao Paulo, with 570 B.Th.U. gas, a therm yield only slightly lower is being obtained.

Some time in the future I may perhaps be able to give the members an idea of the plant and equipment here, and to compare operating methods and conditions with normal English practice. I think they would find it interesting from both the manufacturing and distribution points of view. The city is split-up by mountains, some of them over 2000 ft. high, which form impassable barriers between the various sections. Over 500 miles of main are necessary to distribute the 2000 million c.ft. of gas sent out last year, and pressures of 30 lbs. per sq. in. are not considered excessive in the high-pressure lines.

As to the city of Rio itself, I could easily comment for more than a whole day on its various aspects of interest, both from a gas technical point of view and generally—its beauty, magnificence of its parks and boulevards, architecture, shopping facilities, and public service. But this is neither the place nor the time in which to do it. To speak of the Avenida Rio Branco, one of the main shopping thoroughfares, 1¼ miles long, wide enough to take eight cars abreast, with three lines of trees and 20 ft. of sidewalks, or to say that one can drive from there for 15 kilometres on similar roads along the ocean front, would only be to excite the envy of the members, without satisfying their curiosity as to how we get gas out from the high-pressure pumping station at the gas-works to the rapidly developing districts. Just as to write of the development of the city of Sao Paulo, on a rolling plateau, stretching for hundreds of miles about 2000 ft. above sea level, would not give any idea of the difficulties of developing a distribution system to keep pace with the growth of the city, of already about 600,000 inhabitants, which bids fair to double its size in the next four years.

Your own problems of distribution are of more immediate interest to you, and your own difficulties of supplies, control of labour costs, and perfection of technical efficiency of operation, have a closer and more direct interest, which at the present stage of transition will fully and worthily occupy the whole attention of the members; and in your newly-elected President and Vice-President you have two men whose past work should be, and is, sufficient warranty of their ability to handle these questions in a manner meriting the full confidence of the members of the Association, and whose technical work we know will make for the definite progress of the industry.

Mr. Caton then read his

PRESIDENTIAL ADDRESS.

My first duty must be that of expressing my sincere appreciation of the honour you have conferred upon me by electing me your President. On looking through the roll of Past-Presidents, which contains the names of many distinguished men who will leave their mark imprinted on the destinies of the important industry in whose interests we are all personally concerned, I must confess to a real sense of misgiving; but though my endeavours to uphold the prestige of the Association and to emulate my predecessors in the chair must necessarily be inadequate, I trust that with their assistance, and particularly that of our esteemed Hon. Secretary, my efforts may not prove wholly unacceptable to you, and that the coming year may be one of eminent progress and prosperity for the Association. I appeal, therefore, to the members to do all they possibly can, by attending the meetings of our Association, and by reading and discussing papers, to help to maintain the high tone and character of the proceedings for which the Midland Association has so long been famous.

The difficulty of selecting suitable subject-matter is frequently referred to by those who are called upon to occupy the chair of an Association such as this; for in these days it is assuredly no easy matter, in the preparation of a presidential address, to avoid ground which has been repeatedly traversed, and to impart some degree of interest and originality. On these occasions it is customary to present either some sort of survey of the general aspects of the industry, or a brief description of the undertaking one serves. As the centenary of the Oxford gas undertaking occurred during the war, and at a time when all gas undertakings were in an extremely precarious financial position due to the various Acts governing them, and fixing either standard or maximum prices for gas upon which the dividends were based, not being flexible enough for war conditions, my Directors decided not to celebrate the occasion, as was done in the case of one or two undertakings before the war and several since. I therefore propose to lay before you to-day a few remarks upon the formation and progress of the Oxford Gaslight and Coke Company, and in doing so wish to acknowledge the data of the early history of the undertaking so kindly given to me by my predecessor, Mr. James Eldridge.

Early History.

Some years ago Mr. Eldridge, anxious to find out all he could concerning the origin of the Company, obtained permission to search the files of a local paper, and came upon a paragraph dated Dec. 20, 1817, which read as follows:

> "The first application of coal gas in Great Britain to the purposes of illumination was by Mr. Sadler, late Inspector-General of Chemistry to the Admiralty, about 32 years since, at the Town Hall, Oxford. He has lately much improved the apparatus employed, and has so far succeeded in his endeavours as to have materially shortened the process. He has much increased the production of gas, and has lessened the objectionable part of the operation by decomposing the whole mass of the tar, and getting rid of the sulphuretted hydrogen, which in the common apparatus passed over, and was condensed in a refrigerator."

The above-named gentleman was the celebrated aeronaut who made many ascents from Oxford about the time stated. Mr. Eldridge thought he must be a forerunner of Murdoch, who did not light his house at Redruth until 1792. Upon turning to the newspaper for 1784 he found the following:

> "Mr. Sadler, of this city, begs leave to inform the gentlemen of the University, and the public in general, that he has, with great labour and expense, constructed an air balloon of prodigious magnitude, which is this day suspended and set afloat in the Town Hall, where it will be publicly exhibited every day during the following week. This stupendous and magnificent machine measures 63 ft. in circumference, and contains upwards of 30,000 gallons of inflammable gas. . . . In the display of this astonishing experiment will be shown the best manner of constructing aerial machines, with the fastest and most expeditious method of mixing in due proportion the several materials from which inflammable air is produced."

As no mention is here made of Mr. Sadler having used gas for lighting purposes, Murdoch's laurels must, I suppose, remain unchallenged, and Oxford's Town Hall yield precedence to Redruth in this matter.

The question of starting a Gas Company in Oxford was mooted in the years 1817-18. Public meetings were held, and several letters were written describing the probable advantages, profits, &c., of the proposed undertaking. The following short extracts are given as showing the state of public feeling upon the question of the proposed Act of the Company:

"I am persuaded that much of the angry opposition that has occurred respecting the lighting of this city with gas has arisen in consequence of an erroneous estimate of the expected profits. . . . That the profit in the present instance will never reach so high as to become oppressive to the inhabitants or to require Parliamentary restriction, I am fully convinced. . . . But, admitting for a moment that it did become oppressive, the Commissioners and individuals who might be aggrieved have the remedy in their own hands. They may return to their old plan of lighting with oil and tallow. There is no compulsion either to take the gas at all or to pay for it after it has been taken, as the Bill now stands. On the contrary, the liberality of the gentlemen who are about to carry the matter into effect is such that they have actually engaged to put up new lamp-pillars for the Commissioners, leaving the old lamp-irons in their situations, so that there may be no impediment to their return to their old plan of lighting, if it should be hereafter more eligible or more economical. . . . It is also to be recollected that the city is not lighted more than six months in the year; and the University (deducting their vacations) do not require light for a longer portion of it. In this respect, as well as in its having no manufactories or places of public amusement which create a considerable demand for gas, Oxford differs from all other places hitherto lighted with it, and affords another reason for moderating expectation of profit. . . . But the most important drawback on the receipts is yet to be spoken of; and seems to have been overlooked by those who anticipated a very considerable profit. I allude to the annual expenditure of the establishment, which will not be less than £1500. Among other items will occur the salary of a scientific engineer, the daily wages of several other men (who must be better than mere labourers), the wear and tear of brickwork, retorts, pipes, and the cost of lime; to which is to be added a quantity of coals, which those who do not know the degree of heat requisite for the production of gas would be surprised at. At five of the establishments in London, 35 chaldrons of coal are daily consumed, of which one-fifth only returns to the proprietors as coke, which is now worth little or nothing more than the coal from which it was produced. For these and other reasons which might be added, there is no ground for imposing restrictions. It is not improbable that a sufficient profit may be realized to pay about the legal interest of money, with which the shareholders will, no doubt, be satisfied; but should they get a better one, it will be no more than they are entitled to, after embarking their capital in so precarious a concern as gas speculation."

In May, 1818, the first Act of the Company was passed; and it is worthy of note, as mentioning among the promoters many names eminent, both then and since, in the world of science and learning. The following were included: The heads of Corpus, Magdalen, Queen's, Lincoln, Exeter, Pembroke, and University Colleges; those of St. Mary's, St. Edmund's, and Magdalen Halls; five Canons of Christ Church, many Professors and Fellows of Colleges; several Aldermen, and upwards of fifty influential citizens. The most noticeable are perhaps those of the celebrated Dr. Routh, President of Magdalen College, and the Rev. W. Buckland, Reader in Mineralogy. The latter gentleman was the learned author of the Bridgwater Treatise on Geology, and was afterwards Canon of Christ Church and Dean of Westminster. While he remained in Oxford he acted as Chairman of the Committee of Management, and took a most active interest in the affairs of the Company.

Mr. Eldridge found in the "Oxford Journal" for Sept. 19, 1818, the following account of the laying of the foundation stone, &c.:

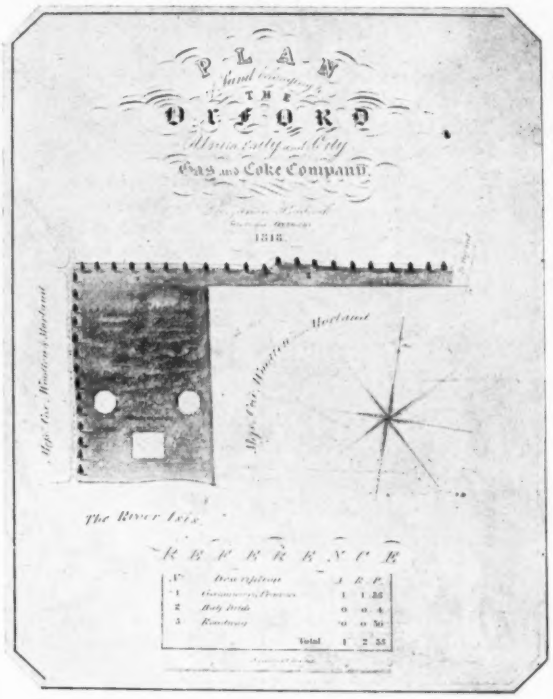
"We congratulate our readers on the prospects we have now before us of seeing our University and city speedily illuminated with gaslight. On Monday morning last four gentlemen of the Committee of Management proceeded to perform the ceremony of laying the foundation stone of the intended buildings. A large stone had been provided for this purpose, in the upper part of which an excavation had been made to receive specimens of the coinage of the last and present years. The coins were placed in a small jar, which was laid in the cavity in the stone, and then sealed quickly with pitch. The cavity was then covered with a plate of copper, bearing the following inscription:

OXFORD GASLIGHT AND COKE COMPANY.

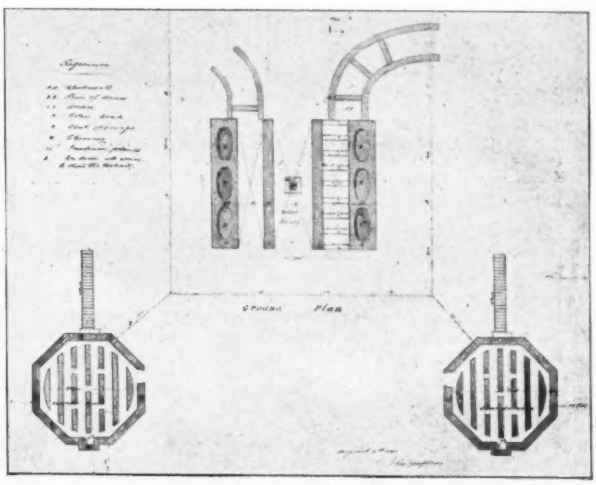
Incorporated May 23, 1818.

"This plate was firmly fixed in the stone with melted lead, and another large stone laid over it. On its being lowered into the ground, the Chairman of the Committee (the Rev. Mr. Buckland) descended, and struck five blows on it with his own hammer —one at the centre, and one at each corner of the stone. He was followed by the Rev. Mr. Dickenson, Mr. Thorp, and Mr. Robert Bliss, the three other members of the Committee who attended on this occasion, and who repeated the same ceremony. This done, it was announced to the workmen that the Committee had ordered some beer to be provided for them in the evening, to drink success to the undertaking. This intimation was welcomed with very grateful and delightful feelings. The whole concluded with three cheers from the spectators."

The site of the works was once occupied by a monastery of the Black Friars. The Engineer engaged to construct the works was Mr. John Grafton; and I am fortunate in being able to lay before you his original drawings. The small ground plan shows the simple arrangement of the works. The buildings erected were of the most substantial character. The retorts were built on stone arches, through which openings were made for shooting the coke into the vaults below. The two gasholders, of the capacity of 10,000 and 12,000 c.ft. respectively, were enclosed in octagon houses built of tooled stone, clamped and strengthened in every possible way. The retort house was later used as a purifying house, and the vaults beneath for engine houses until 1879. The last gasholder house was removed about 1874.



Survey of Original Site.



Ground Plan of Original Works.

Owing to the numerous engagements of the Engineer, a good deal of delay occurred in getting the works ready for making gas; and a lawsuit was at one time imminent. However, all difficulties having been surmounted, in the words of a guide-book of the period, "on Sept. 6, 1819, the brilliant and pure illumination with gas became general throughout the University and City." For some time the Company contracted with the Commissioners to light the streets with oil as well as gas. Gas was sold to the public at 21s. per 1000 c.ft.; and the first year's make appears to have been about 200,000 c.ft. Here again I am able to lay before you an account for gas for the half-year ended March 25, 1826. You will notice the account

OXFORD UNIVERSITY AND CITY

Gas Light and Coke Company.

In pursuance of an Act of Parliament passed in the 58th Year of the Reign of his Majesty, King George the Third, entitled

"An Act for lighting with Gas the University "and City of Oxford and the Suburbs of the "said City"

THIS TICKET certifies that *Thomas Gaisford Clerk Regius Professor of Greek in the University of Oxford* is a Proprietor of this Undertaking, and entitled to a Share of One Hundred and Twenty Pounds therein numbered *16*

In Testimony whereof the Chairman of the Committee of Management of the Affairs of the said Company, hath hereunto set his Hand, and the Common Seal of the said Company was hereunto affixed; the *Tenth* Day of *June* in the Year of our Lord, One Thousand Eight Hundred and *Twenty*

Chairman. *Wm Buckland*

Geo. Rackstrow Clerk.

SUNDAY AND SLATTER, PRINTERS, OXFORD.

Share Certificate, 1820.

No. *9* *25th March 1826*

OXFORD GAS LIGHT & COKE COMPANY.

State of Mr Slatter — High St — Meter No 25 1826

The charge per Annum is when the consumption is
under 10.000 Feet £ 1 .. per Thousand Feet
From 10.000 to 20.000 .... 18/ .. Do
..... 20.000 to 40.000 .... 16/ .. Do
..... 40.000 & upwards .... 14/ .. Do

Gas Account, 1826.

shows the position of the pointer on each dial, and the price ruling per 1000 c.ft. On the back the amount consumed with the receipt for payment. Further, I am able to lay before you an original certificate for one share valued at £120 in the Oxford Gas Light and Coke Company, issued on June 10, 1820, to Thomas Gaisford, Clerk in Holy Orders, Regius Professor of Greek in the University, and signed by the Chairman, the Rev. W. Buckland.

Step by step the price of gas was reduced, until in 1882 it was as low as 2s. 8d. per 1000 c.ft.; and the consumption had increased to 200 millions per annum. Mr. George Lowe succeeded Mr. Grafton as Engineer of the Company. Many of the experiments of both gentlemen were carried out, and their discoveries made, on these works.

The Act of 1869.

The Company did not again apply for an Act of Parliament until 1869. The original site of one acre had been only very slightly added to; and the make by this time had increased to 96 millions yearly. On obtaining increased powers, the Company purchased additional land to the east of the original works. An unusual clause was inserted in the 1869 Act, as follows:

> "If the clear profits of the Company in the preceding year amount to a larger sum than is necessary to provide the rates of dividend by this Act prescribed, and to form or make up the insurance fund by this Act authorized, then, and in such case, the excess of such profits shall be paid over to the Oxford Local Board, to be by them applied in aid of the general district rates made or levied by them in the district of Oxford."

The Company, however, were successful in obtaining a clause in their Act of 1892 repealing this obnoxious provision, upon the Company presenting to the Corporation debentures to the amount of £1000 bearing interest at the rate of 5 p.ct. per annum.

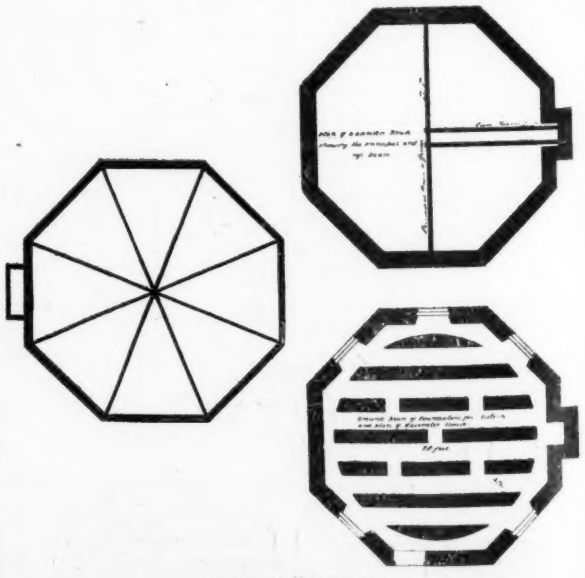
Until the 1869 Act was passed, the Company had no power to let meters on hire; and a large demand at once arose among consumers for their supply. This, with considerable extension of the mains and enlargement of the works, had in 1881 exhausted the capital. An Act of Parliament was again obtained in 1882, with power to purchase further lands on the west side of the original site. Provision was made for the entrance of a siding from the Great Western Railway. Previous to this all coal had to be carted from the station, about a mile distant. Unfortunately, owing to the strenuous opposition to the Company's Bill on the part of the Corporation of Oxford and the University, the Company agreed to a clause in the Bill prohibiting them from manufacturing or converting any products resulting from any materials employed in the manufacture of gas, though by their Act of 1869 they were granted very wide powers in respect of residual products.

Owing to the continued increasing demand for gas, the Company were not long before they had again to apply to Parliament for further powers. In 1891 the annual output had increased to about 300 million c.ft., and the additional capital powers sanctioned by the 1882 Act were exhausted, so in 1892 the Company obtained a further Act authorizing them to raise further capital, extend their limits of supply, purchase additional land, and consolidate the existing capital into capital stock bearing a uniform rate of dividend under the sliding-scale. The Company were again subjected to very strenuous opposition to their Bill by the Corporation of Oxford and the University.

The growth of the Company continued, until in 1912 it had reached 447 millions. The Company then considered the advisability of applying to Parliament for further powers; but before their plans had matured, the war was upon us. The consumption of gas, owing to several reasons, then dropped; and when I was appointed General Manager and Engineer in 1916 it amounted to only 400 millions. By 1918 it had increased to 433 millions. Since then, however, the rate of increase has been phenomenal; and for the year 1924 the figure amounted to 723 million c.ft.

This rapid increase in output due mainly to cooking and heating severely tried the productive capacity of the works, and in October, 1923, the Company applied to the Board of Trade for a Special Order under section 10 of the Gas Regulation Act, for, among other things, power to purchase additional land for the manufacture of gas, to raise further capital, extend the limits of supply, manufacture and convert residual products, and generally to bring our various powers up to date. It was not until August 7, 1924, that the Board of Trade made the Order.

Needless to say we again met with very strenuous opposition from the Corporation of Oxford and the University—to say nothing of the opposition from seven or eight other companies and bodies. Unfortunately, however, the Board of Trade, I understand, omitted to notify the Technical Press of the inquiry to be held at the offices of the Board of Trade in London to hear the objections to our Draft Order, with the result that no record appeared in the Press. The main objection to our Order regarded the power asked for to work up and convert residual products, which the Company allowed to



Holder House Details.

be taken from them by their 1882 Act. After a good fight we succeeded in obtaining a clause permitting us to carry out the process of dehydration of tar and to concentrate our ammoniacal liquor. On the whole, we are satisfied with the Order as made by the Board of Trade.

My Company have lost no time in proceeding with the urgent work they had in view when applying for the Order, as already contracts have been let, and the work is actually in progress for the erection of an entirely new works, on a site adjacent to the present site, to be used as an additional manufacturing station—not in substitution of the present one. The present works is capable of producing 3 million c.ft. of gas per diem, and the new works, when completed, will be capable of producing a further 4 millions. The new retort house will consist of three benches of eight settings each; each setting consisting of eight Ω-section retorts, 24 in. by 17 in. by 23 ft. long, set horizontally and worked by Jenkins De Brouwer latest type of charging and discharging machines. For the present, however, one bench only is being constructed.

It is not my intention to weary you to-day with a description of our present and prospective new works, as it is my pleasure to inform you the Directors invite all members of this Association to Oxford for our Summer Meeting on May 7, to inspect our works.

THE PRESIDENT THANKED.

Mr. BELL, proposing a hearty vote of thanks to the President for his address, said that much interesting matter regarding the Oxford Gas-Works had been collected through the kindness of Mr. Eldridge, whom they were all delighted to see there looking so happy and so well. All would look forward to the summer visit to the city, where they would see an up-to-date works, and one which would indicate that the Company had an Engineer of whom they might well be proud. When Mr. Caton was appointed, the output was 400 million c.ft. per annum, and in eight or nine years it had been almost doubled. He congratulated the members upon their choice of President, and felt sure Mr. Caton would discharge the duties of the office with credit to himself and enhanced credit to the Association. The address indicated that the Oxford gas undertaking was well managed and a go-ahead concern. The price of gas as far back as 1882 was only 2s. 8d. per 1000 c.ft., which spoke volumes for the way in which the undertaking was managed in Mr. Eldridge's time. The Oxford people were still being well served, and getting gas of a good quality at a reasonable price.

Mr. MORLAND, seconding, said he was sure that in Mr. Caton they would have a very efficient President; and they were all looking forward to seeing his works.

Mr. RAMSDEN, as a friend of the President of twenty years' standing, supported the vote, which was heartily accorded.

The PRESIDENT, in response, said that though it might be somewhat uninteresting to the members to sit and listen to a lot of opinions and quotations taken from the local Press more than a hundred years ago, in the days to come the facts he had recounted would form an interesting history of one of the oldest gas undertakings in the country. He believed Oxford was the sixth undertaking to receive parliamentary sanction.

EDUCATING THE GASFITTER.

Mr. R. J. ROGERS (Fittings Superintendent to the Birmingham Corporation Gas Department) then read a paper which, with a report of the discussion, follows.

THE EDUCATION OF THE GASFITTER: HIS PLACE IN THE CIRCLE OF SERVICE.

By R. J. ROGERS, Chief Superintendent, Fittings Department, City of Birmingham Gas Department.

When your Secretary approached me a few weeks ago, and asked me to contribute to your programme this afternoon, I promised him that I would place before you for discussion the subject of the education of the gasfitter. It is a matter to which I have devoted a good deal of thought, particularly in the past four years, during which time I have acted for the Institution of Gas Engineers as Chief Examiner in Gasfitting, under the City and Guilds of London Institute.

During recent years, gas undertakings have realized to a greater extent than heretofore the importance of the adoption of a "service policy" and the necessity for giving the utmost possible attention to the demands and requirements of the gas-consuming public. Therefore, in considering this subject of the education of the gasfitter, I am assuming that we are all agreed with the policy of service, and that we are endeavouring in every possible way to carry this policy into practice.

The industry preaches service, in season and out of season, through advertising and through other channels. We train the men we term salesmen to give that attention which will secure the goodwill of the gas consumer, and in many other directions we are improving our various organizations with the very desirable object in view of giving satisfaction to the public. The question we must ask ourselves is, "Are we all doing everything possible to ensure that the gasfitter gives the best service to our consumers?"

Every undertaking depends to a very large extent on those employees who come into direct contact with the public, and the measure of public goodwill obtained is proportionate to the degree of knowledge possessed by these ambassadors on the district as to the service policy of the undertaking. Therefore, in estimating the importance to the undertaking of the technical education of its manual staff, we must always bear in mind that the gasfitter and the meter inspector are the only representatives of the undertaking with whom a large number of gas users ever come into personal contact.

The gasfitter has a duty to his undertaking, but the undertaking also has a duty to the gasfitter. Not only should we ensure that he is given the necessary technical education, but we should also enlighten him as to the service policy of the undertaking, and educate him in the fundamentals of our business, so that he may convey this service actually into the homes of our customers. Speaking from my experience as Chief Examiner in Gasfitting, I am bound to confess that, in my opinion, there are a good number of gas undertakings who do not yet realize the importance of the gasfitter's place in this circle of service, and who give little or no thought to his training.

Many gas undertakings have for years organized and conducted classes for the technical and theoretical training of their junior and senior gasfitters; and from my personal experience, both as Chief Examiner and as an employer, I am satisfied that any financial expenditure for this purpose has been amply repaid by the improvement in craftsmanship and by the better service the gasfitter is able to render to the community.

THE PRESENT-DAY PRODUCT OF ELEMENTARY SCHOOLS.

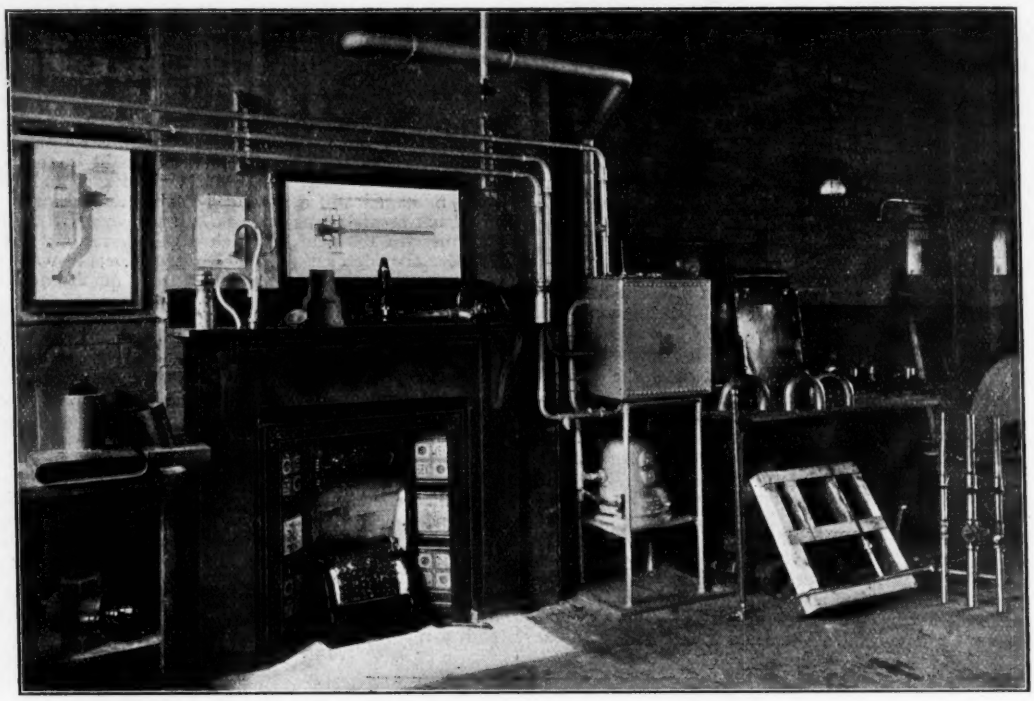
During the past few weeks a good deal of criticism has appeared in the Press with regard to the education of boys in our Elementary Schools. To many people the disclosures as to the inability of boys of 14 to answer elementary general knowledge questions or to solve simple arithmetical problems, may come as a shock, particularly when the large amount of money spent for educational purposes is borne in mind. Unfortunately, I have to admit that, from my experience in interviewing boys of 14 fresh from school, there is in most instances a deplorable lack of knowledge of the principles underlying elementary arithmetic, in that the same boy who is able to do an example from a book of exercises is quite unable to apply the rule when translated into the form in which the problem is likely to be met in everyday life.

This deficiency, however, is not by any means so widespread or so surprising as the almost universal inability of the boys to spell even the simplest words correctly, or to construct a few easy sentences on even the best-known subjects. It is obviously difficult to teach the most elementary science to a class, many of whom could not write down a description of how they draw their pay from the pay office. So far as I have been able to ascertain, this state of affairs is universal throughout the country; and it is generally accepted by those large firms who are in a position to give daytime education to all their young employees, that no instruction of a technical or vocational character should be given during the first two years. They consider it essential that further instruction in mathematics, English, &c., should be given before pupils are able to grasp any instruction of a technical nature.

It is due to this condition of affairs that, in the scheme of training which is carried out for gasfitters' assistants in Birmingham, we include a preliminary course of study extending over two years, and comprising during the first year attendance one night per week at a Workshop Science Class at which is taught arithmetic, simple English composition, construction of sentences, letter writing, &c., and the simple scientific principles underlying recognized workshop practice. During the second year attendance is required two nights a week—one being devoted to drawing and the other to an extension of the Workshop Science Class mentioned above; special attention being given to the elementary theory and laws relating to heat and light.

I want you to remember, also, that the boys we engage for gasfitters' assistants possess certificates of excellence as regards their general character, and have reached a supposedly good standard in their school education. Of the last 26 boys put on as fitters' assistants, three came from Technical Schools, ten had passed Standard VIII., eight had passed Standard VII., and five had passed Standard VI. of an Elementary School.

A few days ago I arranged for the first-year students in our preliminary course (boys of 14 to 15 years of age) to be examined in the "Daily Mail" test questions, of which we have heard a good deal during the past few weeks. On the whole,



A CORNER OF THE WORKSHOP, SHOWING FIREPLACE FOR TRAINING IN FIXING FIRES OF THE "SUNBEAM" TYPE, AND APPARATUS FOR DEMONSTRATING HOT-WATER CIRCULATION.

the questions were well answered by the majority; the following being the result of the examination:

46 p.ct.	of the students obtained	70 p.ct.	and over	of the marks allotted
38 p.ct.	,,	,,	,,	,,	40 p.ct.	,,	,,	,,	,,	,,
16 p.ct.	,,	,,	,,	,,	less than 40 p.ct.	,,	,,	,,	,,

I am quite sure that if the question paper had been set the same youths before they commenced the classes this season, the large majority of them would not have obtained 40 p.ct. of the marks. The teacher in this class reports that there has been a distinct improvement in arithmetic since the beginning of the session, but that English and spelling are still poor, and that some of the students have great difficulty in grasping the lessons in simple physics.

Day Continuation Schools.

From an educational point of view, it is regrettable that the Education Act of 1918, commonly known as the Fisher Act, was not carried into effect in respect to those sections dealing with continued education which was to be provided in Day Continuation Schools. If this section had become law, it would have meant that all young persons below the age of 18 years would have had an opportunity of continuing their education in the daytime for a limited number of hours each week after leaving the Elementary School, and after they had entered employment. The abandonment of the scheme on the score of economy was no doubt, at the time, justifiable; but from the broad point of view, I am sure the individual youth and the business of the nation will suffer from the loss of this form of education. The years from 14 to 18 are perhaps the most important period of a boy's career, when the influence of training is most valuable to the youth in preparing him for his ultimate struggle in life.

In November, 1919, the Birmingham Gas Department, in common with a few other large employers of labour in the city, co-operated with the Education Committee in sending the youths from 14 to 16 years of age engaged in the Gasfitting Department to a Day Continuation School at Aston Manor Technical School. The youths attended for eight hours' study per week—some attending for the eight hours on one day, and others for two half-days of four hours each per week. The department paid the wages of the youths while at school.

The curriculum included English, experimental science, practical mathematics, machine drawing, and handicraft (wood and metal). Particular attention was paid to athletics, in order to foster an *esprit de corps* and supplement the physical training which was planned to correct bodily defects, improve the carriage, and promote endurance, strength, and self-reliance. Unfortunately, largely owing to opposition based on financial grounds, the Day Continuation School at Aston was closed-down at the end of December, 1922, and it was necessary for the department to arrange evening classes for the youths from 14 to 16 years of age.

From my observation of the youths who underwent the two years' training at the Day Continuation School, I am convinced that the system was one which should be encouraged whenever possible. Notwithstanding the almost universal outcry to-day against the heavy cost of education to the taxpayer, I consider that the money spent in this form of practical continuation education can, in the interest of the industry of the country, be well justified, whatever might be said of the other forms of education in use in our Primary and Secondary Schools to-day. Those large business concerns—such as Cadbury Bros., Reckitts, Colmans, Rowntrees, Lever Bros., Mather and Platt, &c.—who are in a position to put a properly trained official in charge of the welfare of their staffs, have found that this additional training during working hours is a sound commercial proposition, and that the more intelligent interest taken in their work by youths so trained reimburses the firm for the time and expense taken-up in this supplementary education.

Gasfitting Classes in Birmingham.

The first classes for gasfitters in Birmingham were commenced in 1899—26 years ago. These were inaugurated for senior gasfitters, and in later years they were extended to embrace also the fitters' youths. It may be of interest if I explain the system of employment and training of gasfitters' youths which has been in use in the Birmingham Gas Department for some years past. Applications for employment are dealt with personally by me, and it is necessary for each applicant to furnish references and to bring with him his school report and birth certificate.

As a general rule, boys are expected to have reached Standard VII. in a Council Elementary School before their applications are considered, although exceptions are made to this rule when I am satisfied that the applicant possesses other necessary qualifications. The fact that a youth has reached the Seventh Standard does not of itself qualify that youth for employment. Personal experience in dealing with the training of youths, and observing their progress over many years, enables one to judge fairly accurately whether or not they are likely to become efficient gasfitters.

It is of the utmost importance that every care be taken in the selection of suitable youths for training as fitters. It is not always desirable or wise to give a boy employment simply because his father or other relative is engaged in the undertaking. Provided, however, he has the necessary qualifications, I always give preference to a boy whose father or brother has been in the employ of the undertaking for some years, and who has proved a good servant. I believe in encouraging the family team spirit, as it tends, in my opinion, to develop better service and loyalty to the undertaking. At the present time there is no difficulty in obtaining good boys for training as gasfitters, and it has become necessary to turn-down a large number of applications each week.

On engagement, the youth is told of the conditions of his employment; one important condition being that he must attend the technical classes on two evenings per week during the winter sessions, until he reaches the age of 21. He is informed as to the prospects of promotion; warned of some of the temptations which will arise in his daily work; and given generally a few words of advice as to his conduct while working with a fitter on a consumer's premises. I should here

Workshop Practice—A Class at Work.

say that the whole of the class fees of the youths are paid by the Gas Committee, no charge whatever falling on the youth or his parent.

For some years past the time of commencement of the classes in the evening has been fixed at 6 p.m., being much earlier than is usual for the commencement of evening classes. This has been arranged with a view to enabling the young student to complete his lessons by 7.30 p.m., so that he may get home in reasonable time to enjoy a good night's rest—many of them living 7 or 8 miles away from the school. The department provide tea for the youths at 5.30 p.m., thus ensuring that no boys go hungry to school, and that they are therefore in a better condition to assimilate knowledge.

Fitters have a standing instruction that boys are to be released from their work on the district in sufficient time to enable them to reach school at the appointed hour; and only in cases of emergency, when a fitter requires the assistance of his youth, is exception allowed to this rule. All absentees from the classes are reported to the office, and prompt inquiries are made as to the reason for non-attendance.

The following is the course of training for Gasfitters' Assistants:

Preliminary Course.	14-16 years of age.		English and workshop arithmetic.
Grade I. (First year).	16-17 " "	One evening.	Workshop science.
		" "	Drawing.
Grade I. (Second year).	17-18 " "	One evening.	Lectures.
		" "	Drawing.
Grade I. (Third year) (First Term).	18-19 " "	One evening.	Practical workshop.
		" "	Lectures.
(Second Term).		One evening.	Practical workshop.
		" "	Drawing.
Grade II. (First year) (First Term).	19-20 " "	One evening.	Practical workshop.
		" "	Lectures.
(Second Term).		One evening.	Practical workshop.
		" "	Drawing.
Grad e II. (Second year).	20-21 " "	One evening.	Practical workshop.
		" "	Lectures.

(For details of syllabus, see Appendix.)

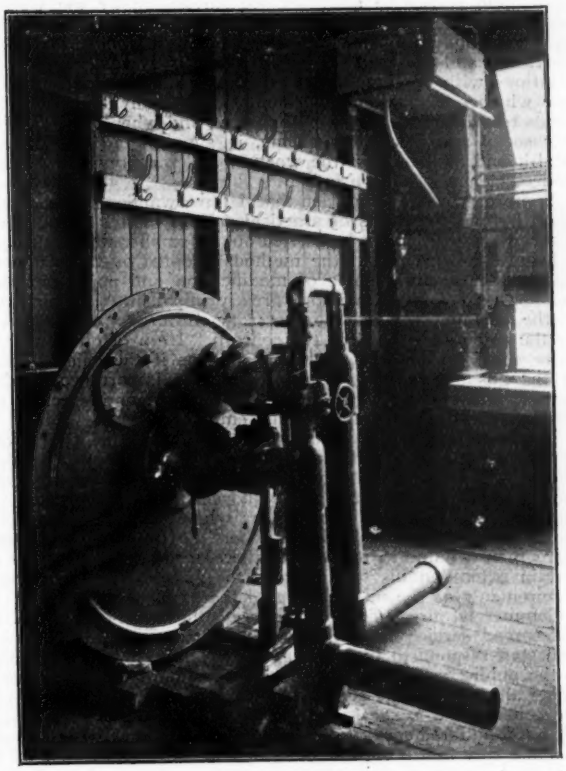
The teachers appointed to conduct the various classes are all employed by the Gas Department in various capacities, and are qualified to deal with this special instruction by reason of their daily experience in the work of the gas undertaking. The classes are arranged by the Municipal Technical School in conjunction with the Gas Department, and are supervised by me in the capacity of Supervisor of Gasfitting Classes.

EXAMINATIONS AND AWARDS.

At the termination of each session's work, class examinations are held, and the results are recorded on an Educational Record Card. Certificates and prizes are awarded by the Gas Committee to the students obtaining the highest aggregate marks in the examinations The Educational Record Card is attached to the youth's Employment Card, and is referred to each time an increase of wages is due; and, if necessary, the youth is spoken to as to his lack of success in recent examinations, and encouraged to put forth a greater effort in future. He is thus reminded that his means of livelihood depend to some extent on the attention he pays to his technical training.

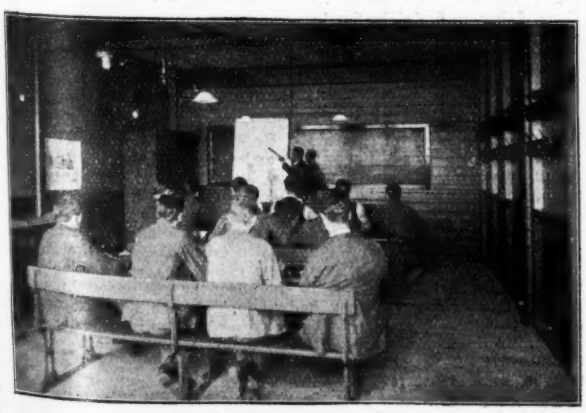
Notwithstanding the care which is taken in the selection of youths for this particular work, we do find in perhaps one or two cases that the youth, after twelve months' or two years' service, does not show any aptitude for the work; and on the report of the district inspector and of the fitters with whom the youth has been employed, he is discharged " as not likely to become an efficient gasfitter." This step is taken as much in the interest of the youth as in that of his employer, as it is not fair to carry him along until manhood, and bring him into a trade where his natural disability will not allow him to work efficiently alongside his fellows. These cases are nowadays very rare, constituting not more than 1 p.ct. of those engaged in the work.

At the conclusion of the examinations each year, a report is forwarded to the parents of the youth, giving the percentage of marks obtained by him for attendance, homework, and in the technical classes. Periodically, the youth is transferred from one fitter to another, the record of his training being entered on a separate card. He works for a period with one fitter on carcassing work, next on automatic installation work, following-on with general gasfitting work of a domestic character, and is then transferred to a district where the majority of the work is concerned with the fitting of industrial appliances. By this means, an all-round experience is obtained in gasfitting.



Back Casting of 300-Light Wet Meter, used for Workshop Practice in Fixing Valves and Connections to Meter.

In addition to their own class examinations, the students are encouraged to enter for the examinations of the City and Guilds of London Institute in Gasfitting. On passing the final examination, the Gas Department award the fitter a permanent increase in his wages of 2s. per week. Promotions to fittings inspectors, new buildings inspectors, and other positions, are made from the ranks of fitters. The systematic training which these men have received over a number of years fits them for taking more responsible posts in the department. Several of the present district inspectors have progressed through the department from fitters' boys.



A Lecture Class in Progress.

NEW REGULATIONS FOR THE TRAINING AND EXAMINATION OF GASFITTERS.

The Advisory Committee on Education of the Institution of Gas Engineers have recently had under consideration the courses and examinations in gasfitting. These will shortly be published, and should prove most valuable in indicating the course of study to be followed by students in gasfitting. The

Sub-Committee responsible for drawing-up the syllabus have devoted a good deal of attention to the subject; and it is hoped that gas engineers and managers will take steps to encourage the youths and fitters in their employ to sit for the examinations next year.

In the reports which I have made during the past three years to the Institution of Gas Engineers on the examinations in gasfitting, I have advocated that some financial inducement should be made to gasfitters to enter the examinations. I feel sure that if gas undertakings would do this, there would be an appreciable increase in the number of candidates for the examinations, and that any outlay of this character would be repaid many times by the improvement and general efficiency of the gasfitting work on the district. Improvement in the gasfitting trade cannot be expected when, as last year, only 19 fitters out of the whole of the British gas industry present themselves for the Final examination, and 78 for the Grade II. examination. The remedy lies in a very large measure in the hands of the gas engineers and managers.

While we in Birmingham insist upon our youths devoting a certain amount of their leisure time to study, we are not unmindful of the part played by social organization in their general education. We have in connection with our gasfitters' and inspectors' sections a very active Social and Recreation Society, who cater for sport and recreation of all kinds. At the present time we have a membership of 724. The various social and recreative activities are carried on by the weekly subscriptions of the members. I believe that the most effective means of allaying suspicion, and of creating the spirit of co-operation and goodwill in our industry, is by fostering happy relations with our employees. Our educational programme is one which not only confers benefits to the individual, but also tends to evolve a better type of citizen; and when coupled with our social and recreative scheme, it should lead to greater health and happiness of the worker, and consequent harmony and efficiency in our business.

Some of you may consider that I have wandered this afternoon beyond the limits of practical politics, and have outlined a scheme which cannot be carried out by smaller undertakings. I believe, however, that the methods adopted by large undertakings are easily capable of modification and application by smaller undertakings, without greatly impairing the efficiency of the scheme, provided the necessary encouragement is given by the responsible head of the concern. I am of opinion that more could be done in the smaller towns if the chief official of the gas undertaking would realize the importance of the matter, and arrange with one of his foremen or inspectors to conduct a course of study for his employees.

In some respects the smaller undertakings actually have an advantage over those in larger towns, inasmuch as the chief official has greater opportunities for personal contact with all the members of the staff and employees, and is thus able to impress his personality upon them; whereas this is denied to him in the larger undertaking, where he must remain little more than a name to many, and therefore has to depend to a certain extent on his subordinates for passing on the service requirements of the undertaking to the employees.

Commercial firms find that one of the definite results of widespread service advertisements on their part is that their own staff respond to the suggestion contained in these appeals to the public, and that a spirit of lively interest tends to permeate all ranks. As I suggested earlier in the paper, for every one consumer who speaks to the chief official of a gas undertaking, a hundred speak to his subordinates. Let us endeavour to make sure that every one of these consumers is treated with the same courtesy and consideration by any member of the staff as he would be by the manager himself, and, by proper training, see that the gasfitter takes his place in this circle of service by contributing the best craftsmanship and attention in dealing with the requirements of our consumers.

In concluding this account of the training of gasfitters' youths in Birmingham, I desire to pay tribute to the encouragement and practical support which has always been extended to this work by the members of the Gas Committee and the General Manager and Secretary of the Gas Department. Without this cordial interest, it would, of course, have been quite impossible to carry out this scheme in Birmingham.

APPENDIX.—SYLLABUS OF GASFITTING CLASSES FOR THE TRAINING OF GASFITTERS' ASSISTANTS IN THEORETICAL AND PRACTICAL COURSES.

Preliminary Course

14-16 Years of Age.

English and Workshop Arithmetic.—Formation of sentences, simple essays, letter writing, &c. Weights and measures. Vulgar fractions. Decimals, averages, and percentages. Areas. Temperature, Centigrade and Fahrenheit scales. Sources of heat and effects of heat on matter. Barometer, pressure gauge, &c.

Grade I.—First Year.

Juniors—16-17 Years of Age.

Workshop Science.—Elementary workshop science, laws of fluids and gases, expansions, volumes, pressures of gas, composition of gases. Elements of force, units of work, simple principles of applied mechanics, elementary mathematics.

Drawing.—Usefulness and importance of drawing. Instruments and materials. Definitions. Geometrical problems and general basic principles of draughtsmanship.

Grade I.—Second Year.

17-18 Years of Age.

Lectures.—Coal gas constituents, properties of coal gas, regulations affecting gas supply, description of appliances. Tools used by gasfitters. The composition and uses of iron, copper, lead, brass, and compo piping, advantages and disadvantages of same. Heat, temperature. Solders, fluxes, jointing material. Coal gas poisoning, treatment for same, artificial respiration.

Drawing.—Representation of objects, plans, elevations, sections, intersections of cylinders, developments, and general geometrical problems.

Grade I.—Third Year.

18-19 Years of Age.

Lectures—[Note: Lectures are given for half the session—viz., until Christmas. These are then replaced by a practical workshop course for the second half of the session.] General uses of coal gas, descriptions of various appliances. Construction and working of both wet and dry low-pressure meters. Reading of indices, principle and uses of pressure gauge. Reading of mercurial pressures. Description of pressure register. Burners, bunsen tubes, illuminating powers, heating values, &c.

Drawing.—Mechanical drawing. Working drawings: (1) Assembly; (2) detail. Scales, lettering, and figures. Screw threads (Whitworth and square). Drawing of nuts and bolts. Pipes and pipe fittings.

Second Half of Session, in Lieu of Lectures.

Practical Workshop.—General workshop principles. Uses of tools, hearth, vice, and bench tools. Bending of compo and lead pipes. Preparation and making of lead and brass joints. Compo and lead joints, grinding of tools. Tempering.

Grade II.—First Year.

19-20 Years of Age.

Lectures.—General principles of distribution, flow of gas through pipes, areas of pipes, wrought and cast-iron services. Wrought and cast pipe jointing. Branching. Syphon arrangements, pots, &c. Positions for meters. Effects of variable temperatures on registration. Construction of low and high pressure meters. Description and working of wet and dry meters. Gearing of indices. Capacities, diaphragms, operation of valves of meters, &c. Construction and design of all types of incandescent lighting appliances. Gas and air proportional mixtures. Combustion, aeration. Coal gas poisoning, respiration treatment, precautions.

Drawing.—Complete drawings of various types of gas apparatus and appliances used in the distribution of gas.

Practical.—General workshop tuition. Preparing and fixing meter connections, lead and compo, compo, and brass joints, lead and iron bending, iron pipe sets, wrought iron burners, making all types of wrought iron fittings, pendants, brackets. Brazing, soldering, fixing of various appliances, lead and compo straight and branch joints, syphon work, socket and thread joints, socket and spigot joints. Fixing and adjusting lighting appliances. Making of lamp iron scrolls, fixing lamps.

Grade II.—Second Year.

Age 20-21 years.

Lectures.—Services, soils, delivering capacities of various sized pipes, friction losses, coating preservatives, pipe trenches, pressure gauges, pressure register, measurement of pressure, types of gauges, recorders, aneroids. Meters (advanced course). Construction of same. Causes of partial and non registration. High-pressure meters, description of same, watering and registration. Illumination, principles of same. Units of light, flame and mantle temperature. Advantages and disadvantages of various types of shades and globes, spherical and hemispherical lighting. Textures, construction and composition of mantles, mantles for various types of lighting. Principles of cookers, gas fires, geysers, gas-heated hot-water appliances. Hot water, principles of same, circulation, faults, remedies. Consumers' complaints, remedies. Various types of street lanterns, construction and design of same, objects aimed for, gas furnaces, gas-heated melting appliances, &c.

Practical.—Fixing and preparing connections for all types of meters, lead and compo connections, showing branch and straight joints, syphons on outlets, lead bends, all types. Inner working parts of meters (shown from models). Fixing, preparing connections, syphons, alteration in price changes, description of interior automatic gearing (shown from models), complaints and faults, remedies. Cutting and threading, setting, squaring of all types of iron fittings, opening and closing of elbows, bends, &c. Internal fitting work, control tap rails, bridging, plugging, iron clips, angle iron work, fixing fittings, pendant and bracket work. Wrought-iron and cast-iron repairs, burners, adjustment, making flue angle pieces, gas connections, fixing-up firebrick, flue brick, arrangement of flue parts, mantel surrounds. Packing, repairs (pinion, ratchet, and slide), fitting of new springs and studs, &c. Fixing, adjusting, construction of various types of upright and inverted burners.

Discussion.

Mr. F. C. Briggs (Dudley), proposing a hearty vote of thanks to the author, said that of course Mr. Rogers was an idealist. The Birmingham motto was "Forward," and the Gas Department carried it out very well. It was a practical ideal that had been put before them, and they were to be congratulated upon getting the paper, because it dealt with a subject of the utmost importance to them at the present time. It was the experience of every one of them that, while their works costs were going down every day, even though they made more gas, the district costs were going up correspondingly. It was perfectly true to say that, for the effect the gas undertaking produced on the consumer, they had to look to the gasfitter and the meter inspector. Mr. Rogers had impressed his spirit, and the spirit of the Birmingham Gas Department, upon every man in the undertaking. He (the speaker) must disagree entirely with the suggestion that in some respects the smaller undertakings actually had an advantage in this matter over those in larger towns. True, the chief of the undertaking could get a little more into personal contact with the gasfitter; but the existing gasfitter was not always ready to

learn. They must start with the boys, and it was here that the difficulty of the smaller undertaking came in. Mr. Rogers mentioned having classes for boys, and in Dudley they had endeavoured to do something of this kind. They made it a condition that boys should go to evening classes, but he felt convinced that this was not going far enough. Boys who had been working all day could not assimilate information adequately in evening classes. For this a part-time system must be arranged, and it raised a big problem. When they got a boy, they had to commence by teaching him what he ought to have learned at the elementary school. He did not blame the elementary schools for this. With existing slum conditions, how could one expect the teacher to do in a few hours anything better with a child who was running about the streets the remainder of the day? Part-time education was the thing they must face; but how were they going to keep the boys after they had trained them? With Mr. Rogers it was easy, for reasons which would be appreciated; but in a town like Dudley it was much more difficult. The author did not say anything about trades unions; but could not they do a great deal? No doubt these unions had come to stay. They took a proper part in the organized life of to-day, and they should insist upon their members being properly trained. As a matter of fact, he believed the Society of Engineers did do so before the war. If the unions demanded a proper rate of wages, they should see that their members were properly trained.

Mr. Harold Davies (Chesterfield) asked Mr. Rogers at what period of their training he provided these boys with tools.

The Thanks of the Institution.

Mr. J. Ferguson Bell (Derby) said that, on behalf of the Institution of Gas Engineers, and as their President, he desired now to tender thanks to Mr. Rogers for all that he had done towards making the gasfitter the man he ought to be. It was most important work, and Mr. Rogers had done it thoroughly well. ["Hear, hear."] He had been for four years Chief Examiner in Gasfitting, and in connection with the new Institution Scheme he had rendered invaluable assistance. It was most urgent that they should have better technically trained men to put on the district, both as inspectors and fitters, for in those positions men could do more than anybody else to help a gas undertaking in its business relations with the consumers. For a long time gas engineers were quite content to make and sell cheap gas, and did not take sufficient care to see that the value of the article was brought prominently to the notice of the consumer. The difference between stoves and fittings properly and improperly fixed, meant content or discontent on the part of the consumer with the supply. As a Manager of the Elementary Schools at Derby, he had long thought the syllabus was too crowded. What they should do was to teach boys and girls the three "R.'s," and then, after they left there they could attend Continuation Schools. What the Education Committees needed to remember was that probably 75 to 80 p.ct. of these boys and girls must occupy their working hours on manual labour. Therefore manual labour should be dignified, so that those engaged in it would take a pride in their work. In Derby they found that the boys trained in their own works generally gave most satisfactory service to the consumer. For the gasfitters there were three grades in that town. They tried to get boys to serve five years, and then they went into grade 1. Subsequently they passed into grade 2, and eventually into grade 3. His own experience of the older gasfitters was that they were, on the whole, an admirable body of men. If they were well looked after, they reciprocated. What was wanted to-day was that the responsible heads of gas undertakings should get into close touch with their young men—take a personal interest in them, and try to induce them to attend technical schools or colleges. He was rather in agreement with the author that the smaller towns could do as much and as useful work in training gasfitters as the large ones. It was most important that they should all realize the position, and make it worth the boys' while to do what was required of them. Of course, if they wanted skilled craftsmen, they must pay them a proper rate of wages. Personally, he was a very strong believer in the old apprenticeship system, and it was a great pity that in this country it had been to some extent displaced. It would be a good thing to get back to it, so as to teach men to be skilled craftsmen. Unions ought not to admit members unless they were such. Previous to the war, the engineers were very particular as to whom they allowed to become members of their Society; but afterwards the door was opened wide, and now one found skilled engineers getting less than street sweepers in the big towns. The Society had degraded the work by allowing unskilled men to come in as members. Sports and other forms of recreation should be encouraged. Men who took a keen interest in sport would work in harmony one with another. He was not certain that they should tell boys that they could have a day off in the week to attend school. The boys must be called upon to make some sacrifice themselves. Working hours were much shorter now than used to be the case; and when boys left the shop at 5 o'clock, they could easily go and put in a couple of hours at some suitable school. The Educational Authorities should endeavour to keep in closer touch with boys after they left school. If the boys were got hold of at fourteen, they could be taught to be competent craftsmen. It must always be borne in mind that properly-fixed apparatus meant a satisfied consumer. He had pleasure in seconding the vote of thanks.

Mr. H. J. Woodfine (Wellington) wished to say, as the Manager of a small undertaking, that he had had the utmost difficulty in bringing along boys as apprentices. Probably seven or eight boys had passed through his hands, and he could state, without any hesitation whatever, that in no single instance had he had one who could spell. In connection with the training of boys, it was essential that one should have a really competent foreman fitter, and such a man was not always easy to obtain. An adequate wage must be offered in order to secure a man who could convey to the boys under him the knowledge which it was desirable for them to have. This was a matter that the gas industry should take into account.

The President (Mr. W. E. Caton, of Oxford) inquired whether Mr. Rogers had the lads bound in any way. Were they apprenticed or tied for any period, and, if so, how long? What were the rates of pay to start with, and the annual increases provided satisfaction were given? He found that a number of boys about the age of seventeen or eighteen left and took positions in engineering works where they received rather higher rates of wages than the Gas Company could afford. Of course, in Oxford they had no apprenticeship system.

The Author's Reply.

Mr. Rogers said the subject of the paper was one in which he had for a very long time taken a great interest, and it had been a pleasure to pass on any little information that he had gleaned from his experience in these matters. Certainly there was a problem presented by what might be termed the old school of gasfitters. They unfortunately had not had the opportunity which the younger gasfitters got to-day in the large towns; and when a man reached the age of forty or thereabouts it was very difficult to induce him to attend any sort of class. While he might be a thoroughly practical man, he might be lacking in certain qualities which it was now considered essential for a gasfitter to possess. So they had to some extent to leave the older school alone, and concentrate attention on the younger generation; and it was only because they had in Birmingham had this scheme in operation so many years that they had been able to build-up a really sound staff of tried fitters—men who had had seven or eight years' technical training, in addition to their practical training. They were second to none in the country, mainly because they had been trained from the time when they left school. This was the only way. They must take a youth straight from school. As long ago as 1906, in a paper which he read before the Midland Junior Gas Association, he had urged the desirability of gas companies and corporations giving facilities for the education and practical training of boys as gasfitters, but little had since been accomplished in this direction. Yet it became more necessary every day; they simply must have a properly trained fitter. He would like to say at this point, on the authority of Mr. A. W. Smith (the General Manager), that the Birmingham Corporation Gas Department had for some years past offered facilities to undertakings in the immediate vicinity to send boys, if they desired to do so, to those schools controlled by the Education Committee or the Gas Department. In various instances this offer had been taken advantage of. The point had been raised as to how they kept the boys in Birmingham. They paid them according to a definite scale of wages arranged in consultation with the National Union of Gasfitters and Allied Workers. Careful attention was given to the scale, to see that it was no worse than that applicable to engineering boys in the district. Consequently there was no advantage to the boy, from the point of view of wages, in moving from the Gas Department to any engineering trades in the locality; and he thought the boy also felt that he had got possibly more permanent employment in the gas industry than he might have in a trade boom in an engineering works outside. Certainly, very few lads left them to go elsewhere, unless they were removing from the district with their parents. In Birmingham the utmost strictness was exercised with regard to a youth's birth certificate, because of his wages being dependent upon it. He suggested that gas undertakings, when engaging young men, might well insist upon seeing their birth certificates. The scale of pay was graduated in Birmingham up to twenty-one; and they did not in the ordinary way give the boys their tools until they had reached this age. The Gas Department had recently, however, owing to the large amount of fitting work requiring to be done, made arrangements with the union whereby boys of nineteen or twenty were able to take their tools and do light fitting work, for which they received an additional 7s. 6d. In some districts a gas manager might send a boy of nineteen out to do all sorts of general gasfitting work, while he was not getting a gasfitter's rate of pay. The boy might be quite capable of doing the work; but they did not adopt this course in Birmingham, because it was an arrangement with the union which they loyally carried out. It was only fair to the unions in his district for him to say that they did not take into membership men who were not gasfitters in the general sense of the word. They were very strict in this respect. They took boys of eighteen into the union, and watched over their interests from that point. Occasionally, too, they raised a question about boys below eighteen, but they were usually minor points. The training in Birmingham extended from fourteen or fifteen to twenty-one; but the full rate of pay was not reached until a fitter arrived at the age of twenty-three. He came under another graduated scale from twenty-one to twenty-three. The main point to keep in view was to see that the scale approximated to that paid in the local engineering works; and he did not think that this would be found to be an exorbitant price for them to pay for their gasfitters. The sooner the whole question of the curriculum in schools—which was now too crowded—was thoroughly threshed out, the better it would be for the young boys of this country. With regard to grading men, he would like to see a system of grading arranged so as to give the men some reward if they passed the final examination. Unless more than two or three undertakings—as was the case to-day—took this matter up, they would never get gasfitters generally to try for the examination. Without some reward, they could not expect a gasfitter to go out of his way to improve his knowledge for the benefit of the gas undertaking. The apprenticeship system had not been adopted in Birmingham, and they had not seen any real need for it, because they had experienced no great migration of boys from their staff; but he could quite realize that in certain circumstances it might be a very good arrangement to adopt some scheme of the kind. Very much depended upon having a good foreman fitter. There had, he knew, been difficulty in getting such a man; but he was hoping that the youths who were coming along now would prove themselves just the sort for the job, with the training schemes that were in operation. With the support of the Gas Committee and Mr. Smith, they in Birmingham regarded this matter in a broad way. They realized that they had perhaps been able to give their men a better training than they would have got elsewhere; and if they felt that the general status of the gasfitting trade was being improved, they had no objection to letting a man go. ["Hear, hear."]

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND FOUR OF THE SUBURBAN GAS COMPANIES.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER 1000 C.FT. SOLD IN THE YEAR 1924.

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

	Gas Light and Coke.	South Metropolitan.	Commercial.	Wandsworth.	South Suburban.	Tottenham.	Brentford.
Gas sold . . . . . thousands	36,504 917*a*	15,929,134	3,955,735	3,201,458	3,321,486	2,855,389	6,091,979
Gas made per ton of coal carbonized. cubic feet	13,096	12,905	13,724	14,472	12,208	14,127	..
Gas unaccounted for . . . . . per cent.	5·90	2·82	7·96	7·81	5·89	6·07	6·22
Coke made for sale per ton of coal . cwt.	10·49	9·83	11·57	10·07	9·78	9·00	10·20
Tar made per ton of coal. . . . . gallons.	9 35	9·35	9·88	9·06	10·38	10·20	10·40
Liquor made per ton of coal . . gallons, 8 oz.	35·45	40·82	37·03	36·70	34·26	36·75	34·95
Percentage of coke used as fuel	17·28	19·86	14·29	18·37	22·52	23·23	17·72
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Capital expended per 1000 cubic feet sold . . .	8 6·10	7 6·37	7 9·10	7 11·69	9 7·34	9 7·09	8 5·21
Price of gas charged per 1000 cubic feet . . .	3 7	3 8 8	3 5·8	3/3·66 to 3/11	3/11·04 to 4/5·76	4/1. 3/11	4/1 and 4/7
Costs per 1000 Cubic Feet of Gas Sold.							
REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	24·37	27·92	28 06	28·02	30·55	25·97	29·60
Less residuals—Coke and breeze.	12·60	14·63	15·08	13·62	12·74	9·80	10·09
Tar	2 57	2·54	2·58	2·76	3·28	2·07	2·26
Amm. liq. and sulph. amm.	·91	1·59	1·62	·70	·68	·92	·45
Total residuals . . .	16·08	18·76	19·28	17·08	16·70	12·79	12 80
Net for coals, oil, &c. .	8 29	9·16	8·78	10·94	13·85	13·18	16·80
MANUFACTURE—							
Salaries	·53	1·16	·89	·95	1·14	·63	·97
Wages—carbonizing	2·28	3·07	2·77	2·82	3·34	2·80	3·08
Purification	·28	·93	·44	·79	·54	·51	·53
Repairs—plant	8·70	8·64	8·24	9·73	8·18	10·64	9·76
Net manufacture . .	20·08	22·96	21·12	25·23	27·05	27·76	31·14
DISTRIBUTION—							
Wages and salaries	2·40	1·52	1·72	1·86	2·25	1·49	2·29
Repairs—Mains and services, &c.	3·09	3·56	2·52	3·26	3·64	7·06	3·32
„ Meters and prep. meters and fittings.	1·92	4·28	2 96	2·76	3·31	2·61	1·56
„ Stoves—ordinary and prepayment .	2·99	3·33	3·73	3·48	2·25	2·25	2·28
Total net manufacture and distribution .	30·48	35 65	32·05	36·59	38·50	41·17	40·59
Public lamps—lighting and repairing	·73	·93	·50	·67	1·05	·58	·68
Rents, rates, and taxes	3·51	2·00	2·71	1·41	1·84	2·48	2·37
MANAGEMENT—							
Directors, Auditors, and salaries (Secretary, &c.)	·39	·60	·62	·60	·76	·71	·56
Collectors	·90	1·16	1·39	1·00	·92	1·02	·82
Stationery and general charges.	·60	1·12	·93	·84	·77	·67	·64
Profit-sharing	·47	1·00	·81	1·58	·91	·72	..
Bad debts.	·06	·05	·04	·05	·02	·03	·03
Law and parliamentary charges	·03	·04	·03	·02	·02	·02	·03
Superannuations, Pension Funds, &c.	·77	·96	1·37	·84	1·27	·93	·53
National Insurance	·30	·41	·29	·36	·22	·33	·33
Sundries	·04	·05	·03	·02	..	..	·03
Total expenditure (*less* residuals) . .	38·28	43·97	40·77	43·98 *e*	46·28	48·66	46·61
GAS.	41·29	43·24	40 73	40·42	47·59	47·30	49·02
Rentals—Meters and prep. meters and fittings.	4·00	4·38	3·82	5·28	3·08	1·95	4·59
Stoves	1·89	1·75	2·33	4·74	2·63	6·97	1·73
Incand. mantle maintenance . . .	..	..	·09	·58	..	·01	..
Miscellaneous	·15	·07	·04	·14	·09	·18	·05
Total—Gas, rentals, &c.	47·33	49·44	47·01	51·16	53·39	56·41	55·39
Balance, being profit	9·05	5·47	6·24	7·18	7·11	7·75	8 78
Dividend and interest	8·81	7·61	8·63	8·00	7·83	8·00	8·00
Surplus or deficit	·24	*Def.* 2·14	*Def.* 2·39	*Def.* ·82	*Def.* ·72	*Def.* ·25	·78
Contributions to funds and sundry payments. .	·26*b*	·47*c*	..	·01 *f*	..	..	·79 *d*
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	29 5·41	28 9·36	31 5·76	31 0·80	..	30 9·47	..
Coke realized per ton of coal	16 2·24	14 9 91	17 7·86	14 9·22	15 8·86	12 8·69	14 9·60
Coke „ „ of coke	30 10·36	30 2·09	30 6·22	29 3·93	32 2·31	28 3·36	29 0·34
Breeze „ per ton	13 11 03	4 2·09	5 7·05	7 5·54	3 11·20	9 3·32	7 9·47
Tar realized per gallon	0 4·57	0 3·36	0 3·61	0 4·24	0 4·78	0 3·58	0 3·32
Amm. liquor, &c., realized per butt (8 oz.) . .	3 10·51	4 4·01	5 7·73	2 6·07	2 8·47	3 11·81	2 0·64
Percentage of stoves at rental to consumers . .	82	..	93	99	114	85	93
Bad debts per cent. on total receipts	·09	·07	·06	·07	·04	·04	·05
Net profit per cent. on ordinary capital	5·56	3·60	3·96	6·11	5·20	7·17 *g*	7·11
Water gas per cent. on total make of cubic feet	27·08	..	13·50	10·77	25·23	26·27	..

a—Adjusted for Temperature and Pressure.

b—Redemption Fund.

c—Discount on Preference Stock Redeemed ·22
Reserve Fund . . . . . ·25
·47

d—Expenses Brentford Gas Order, 1924.
e—Capital Duty eliminated.
f—Capital Duty.
g—Including Electricity Results.

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND FOUR OF THE SUBURBAN GAS COMPANIES.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER THERM SOLD FOR THE YEAR 1924.

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

		Gas Light and Coke.	South Metropolitan.	Commercial.	Wandsworth.	South Suburban.	Tottenham.	Brentford.
Declared calorific value	B.Th.U.	500	560	475	470	480	500	500
Gas sold on declared calorific value	therms	182,524,585*a*	89,203,150	18,789,741	15,046,853	15,943,134	14,276,944	30,459,899
Increase	per cent.	6·49	6·12	6·41	6·43	9·52	6·44	11 67
Gas made per ton coal on works tests	therms	71·21*b*	72·27*d*	68·85	68·74	..	70·35	..
Gas unaccounted for	per cent.	5·90	2·82	7·96	7·81	5·89	6·07	6·22
Coke made for sale per ton of coal	cwt.	10·49	9·83	11·57	10·07	9·78	9·00	10·20
Tar made per ton of coal	gallons	9·35	9·35	9·88	9·06	10·38	10·20	10·40
Liquor made per ton of coal	gallons, 8 oz.	35·45	40·82	37·03	36·70	34·26	36·75	34·95
Percentage of coke used as fuel		17·28	19·86	14·29	18·37	22·52	23·23	17·72
Capital expended per therm sold		s. d. 1 8·42	s. d. 1 4·14	s. d. 1 7·60	s. d. 1 8·36	s. d. 2 0·03	s. d. 1 11·02	s. d. 1 8·24
Price of gas per therm		8⅝d.	8d.	8⅝d.	7½d. to 10d.	9½d. to 11⅛d.	9⅝d., 9⅝d.	9⅛d., 11d.
Costs per Therm Sold.								
REVENUE ACCOUNTS.		d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.		4·88	4·99	5·91	5·96	6·37	5·19	5·92
Less residuals—Coke and breeze		2·52	2·61	3·18	2·90	2·65	1·96	2·02
Tar		·52	·45	·54	·58	·69	·41	·45
Amm. liq. and sulph. amm.		·18	·29	·34	·15	·14	·18	·09
Total residuals		3·22	3·35	4·06	3·63	3·48	2·55	2·56
Net for coals, oil, &c.		1·66	1·64	1·85	2·33	2·89	2·64	3·36
MANUFACTURE—								
Salaries		·11	·21	·19	·20	·24	·12	·19
Wages—carbonizing		·45	·55	·58	·60	·70	·56	·62
Purification		·06	·16	·09	·17	·11	·10	·11
Repairs—plant		1·74	1·54	1·74	2·07	1·70	2·13	1·95
Net manufacture		4·02	4·10	4·45	5·37	5·64	5·55	6·23
DISTRIBUTION—								
Wages and salaries		·48	·27	·36	·40	·47	·30	·46
Repairs—Mains and services, &c.		·62	·64	·53	·69	·75	1·41	·66
" Meters and prep. meters and fittings		·38	·76	·62	·59	·69	·52	131
" Stoves—ordinary and prepayment		·60	·59	·79	·74	·47	·45	·46
Total net manufacture and distribution		6·10	6·36	6·75	7·79	8·02	8·23	8·12
Public lamps—lighting and repairing		·15	·16	·10	·14	·22	·12	·14
Rents, rates, and taxes		·70	·36	·57	·30	·38	·50	·47
MANAGEMENT—								
Directors, Auditors, and salaries (Secretary, &c.)		·08	·11	·13	·13	·16	·14	·11
Collectors		·18	·21	·29	·21	·19	·20	·16
Stationery and general charges		·12	·20	·19	·18	·16	·13	·13
Profit-sharing		·09	·18	·17	·33	·19	·14	..
Bad debts		·01	·01	·01	·01	·01	·01	·01
Law and parliamentary charges		·01	·01	·01	·01	·00	·00	·01
Superannuations, Pension Funds, &c.		·15	·17	·29	·18	·26	·19	·11
National Insurance		·06	·07	·06	·08	·05	·07	·06
Sundries		·01	·01	·01	·00	·00	..	·00
Total expenditure (*less* residuals)		7·66	7·85	8·58	9·36*g*	9·64	9·73	9·32
GAS		8·26	7·72	8·57	8·60	9·91	9·46	9·80
Rentals—Meters and prep. meters and fittings		·80	·78	·80	1·13	·64	·39	·92
Stoves		·38	·31	·49	1·01	·55	1·39	·35
Incand. mantle maintenance		..	..	·02	·12	..	·00	..
Miscellaneous		·03	·02	·01	·03	·02	·04	·01
Total—Gas, rentals, &c.		9·47	8·83	9·89	10·89	11·12	11·28	11·08
Balance, being profit		1·81	·98	1·31	1·53	1·48	1·55	1·76
Dividend and interest		1·76	1·36	1·82	1·70	1·63	1·60	1·60
Surplus or Deficit		·05	*Def.* ·38	*Def.* ·51	*Def.* ·17	*Def.* ·15	*Def.* ·05	·16
Contributions to funds and sundry payments		·05*c*	·08*e*	..	·00*h*	..	..	·16*f*
SUNDRIES.		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton		29 5·41	28 9·36	31 5·76	31 0·80	..	30 9·47	..
Coke realized per ton of coal		16 2·24	14 9·91	17 7·86	14 9·22	15 8·86	12 8·69	14 9·60
Coke " " of coke		30 10·36	30 2·09	30 6·22	29 3·93	32 2·31	28 3·36	29 0·34
Breeze " per ton		13 11·03	4 2·09	5 7·05	7 5·54	3 11·20	9 3·32	7 9·47
Tar realized per gallon		0 4·57	0 3·36	0 3·61	0 4·24	0 4·78	0 3·58	0 3·32
Amm. liquor, &c., realized per butt, 8 oz.		3 10·51	4 4·01	5 7·73	2 6·07	2 8·47	3 11·81	2 0·64
Percentage of stoves at rental to consumers		82	..	93	99	114	85	93
Bad debts per cent. on total receipts		·09	·07	·06	·07	·04	·04	·05
Net profit per cent. on ordinary capital		5·56	3·60	3·96	6·11	5·20	7·17*i*	7·11
One-fifth penny variation equals		£152,104	£74,336	£15,658	£12,539	£13,286	£11,897	£25,383
Water gas per cent. on total make of cubic feet.		27·08	..	13·50	10·77	25·23	26·27	..

a—Adjusted for Temperature and Pressure.
b—Before Benzole Extraction.
c—Redemption Fund.
d—On Declared Value.

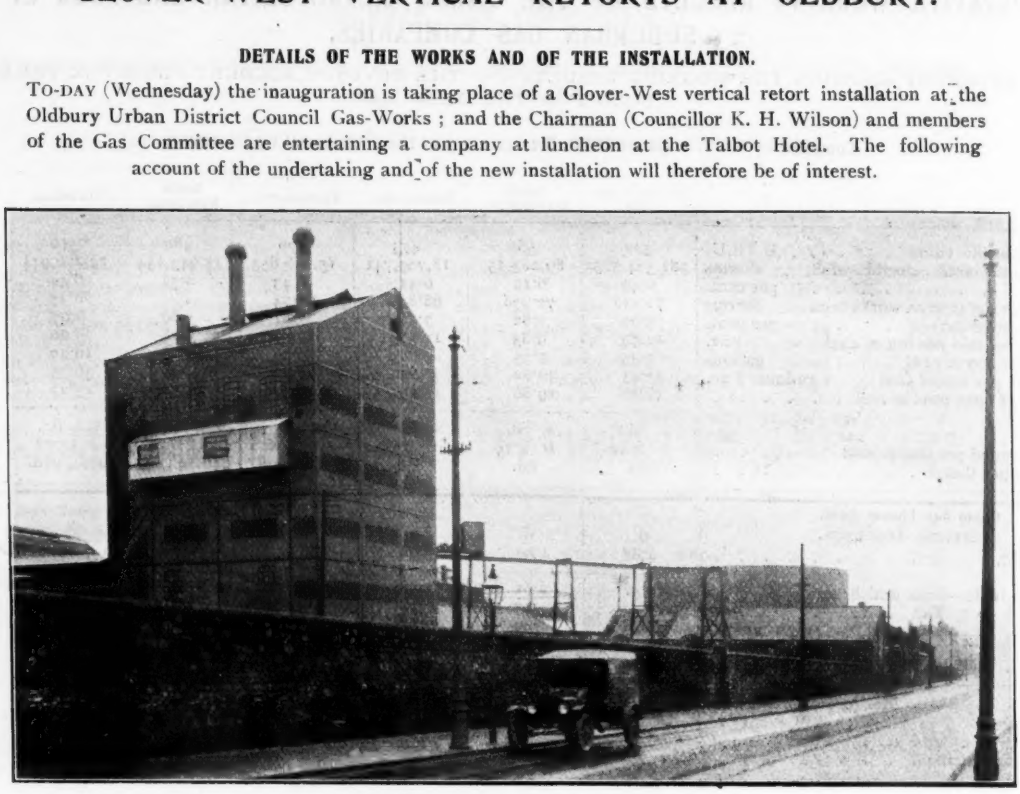
e—Discount on Pref. Stock Redeemed . d. ·04
Reserve Fund . . . . . ·04
·08

f—Expenses Brentford Gas Order, 1924.
g—Capital Duty eliminated.
h—Capital Duty.
i—Including Electricity Results.

GLOVER-WEST VERTICAL RETORTS AT OLDBURY.

DETAILS OF THE WORKS AND OF THE INSTALLATION.

TO-DAY (Wednesday) the inauguration is taking place of a Glover-West vertical retort installation at the Oldbury Urban District Council Gas-Works; and the Chairman (Councillor K. H. Wilson) and members of the Gas Committee are entertaining a company at luncheon at the Talbot Hotel. The following account of the undertaking and of the new installation will therefore be of interest.



THE GLOVER-WEST HOUSE AT OLDBURY.

THE GAS-WORKS.

Oldbury was originally supplied with gas from the Swan Village Works of the Birmingham Corporation, who had previously bought-up the Birmingham and Staffordshire Gas Light Company, and also the Birmingham Gas Company in 1875. Owing to the opposition of the West Bromwich Improvement Commissioners, and the Smethwick, Oldbury, and Tipton Local Boards, a clause was inserted in the Birmingham Gas Bill enabling these Authorities to purchase the right to erect gas-works and supply gas. The Oldbury Gas Act received the Royal Assent in 1876, and works were laid down for an output of 40 million c.ft. per annum, and were opened on Dec. 31, 1881.

During the first two years many alterations and extensions were carried out by the Engineer (Mr. F. J. North), who left Oldbury in 1885 for Para, and was succeeded by Mr. C. Meiklejohn. In August, 1892, Mr. Meiklejohn was appointed to Rugby, in place of Mr. P. Simpson. The management was then taken by Mr. C. H. Carder, who held the position until March last year, when he went to Rio de Janeiro. Mr. Joseph Poulson then became Engineer and General Manager.

Since 1912 the works have undergone considerable development and extension. The gas-making plant then consisted of horizontal retorts and carburetted water gas plant. The horizontal retorts have been out of operation since the installation of vertical retorts, and will shortly be completely dismantled. The carburetted water gas plant comprises a Merrifield-Westcott-Pearson plant of a daily capacity of 340,000 c.ft., and a Humphreys and Glasgow plant erected in 1915-16 of a capacity of 250,000 c.ft. per diem. The whole of the gas at the present time is being manufactured in the Glover-West vertical retorts which were put into operation in June, 1923.

The auxiliary plant consists of annular condensers of 1½ million c.ft. daily capacity; belt-driven exhausters, one of 50,000 c.ft., and one of 30,000 c.ft., hourly capacity; a Livesey washer of a daily capacity of 1½ million c.ft., installed by Messrs. C. & W. Walker in 1924; a sulpho-cyanide washer and Holmes brush washer of 1½ million c.ft. daily capacity; five purifier boxes each 25 ft. by 25 ft. by 5 ft., for use with oxide of iron; a station meter of 50,000 c.ft. hourly capacity; and one 20-in. and one 10-in. district governor. There are three gas-holders, of a total capacity of 840,000 c.ft. The works are well equipped with a laboratory and scientific apparatus for testing and chemical control.

The total length of mains in the district is 33 miles. The undertaking now serves 1949 ordinary and 4270 slot consumers. Future developments include a tar dehydration plant, which is already in course of construction, and the dismantling of the horizontal retort house. The old boiler house will also be removed, and new exhausting plant will be installed in its place. A showroom for gasfittings and appliances is to be provided at the works. It is proposed to use surplus steam from the waste-heat boiler erected with the Glover-West vertical retorts for the generation of electricity for works use.

A NEW DEVELOPMENT.

A tender for the supply and erection of Glover-West vertical retorts by West's Gas Improvement Company, Ltd., of Manchester, had been accepted before the close of the war, but the restrictions in public expenditure then in force prevented any progress being made, and it was not until 1923 that erection actually commenced. By this time great strides had been made in the development of this now widely-adopted retort.

An installation of sixteen "New Model" 40-in. retorts, with an estimated capacity of 1,400,000 c.ft. of gas, at a calorific value of 470 B.Th.U., was erected at Oldbury, and gas making commenced in June, 1923. In the original designs of this installation, certain departures were made from standard practice. Fireclay was used to a greater extent in the bottom portion of the retort than had been the case since the introduction of silica. After twelve months' working, this proved to have been an error, and it was decided to rebuild certain portions of the settings embodying other improvements which had been successful elsewhere. At the same time a waste-heat boiler was added to the installation. The supply of gas to the town was maintained without interruption during the carrying-out of these alterations.

The results have fully justified the modifications adopted. The original estimate of a gas-making capacity of 87,500 c.ft. per retort has been brought up to a maximum of over 100,000 c.ft., with averages over lengthy periods under actual working conditions of 94,000 c.ft. of gas per retort per day at a calorific value of 450 B.Th.U. There is a great probability that most of the large installations in the future will be constructed on the 40-in. "New Model"

In the Oldbury settings, all the recent improvements have now been embodied. The internal uptake which retains the hot products of combustion within the setting until they pass to the circulating chambers and thence to the waste-heat boiler; the supplementary secondary air rising in the back wall of the settings, combining regeneration with insulation; and the arrangement of secondary air passages within the walls of the settings, adding to their heat-stability and increasing the efficiency of the combustion; all are incorporated in the design.

The installation is fitted with a Spencer-Bonecourt, Kirke's patent, induced draught horizontal waste-heat boiler, having an evaporation of approximately 4200 lbs. per hour when the retort plant is operating on full load. The waste gases are collected from the chimney bases in suitable steel-cased flues, lined with "Derbysil" insulating bricks and a protecting layer of firebrick; the heat loss in the flues thereby being reduced to an absolute minimum. The boiler plant (manufactured by Messrs. Spencer-Bonecourt, Ltd.) is of that Company's standard design for Glover-West settings, and is fitted with electrically-

driven induced draught equipment, the usual automatic feed control, the "Hilo" alarm, and duplicate feed pumps. The exit gases from the boiler (which are at a temperature only slightly higher than saturated steam temperature) exhaust to atmosphere through a short discharge chimney over the fan. The superheater is arranged for dealing with the steam at 120 lbs. per sq. in. working pressure, and gives a total temperature of approximately 500° Fahr. at the stop valve. In the steam line to the retorts is fixed one of Auld's reducing valves, to adjust the pressure to the requirements of carbonization; while each retort is fitted with a West-Taylor steam-regulating valve for exact distribution of steam between the retorts. A full system of isolating dampers is provided, so that either setting can be changed over to natural draught and cut off from the boiler if necessary.

COAL AND COKE HANDLING.

Coal is fed to a powerful breaker by means of a reciprocating feed with an adjustable stroke, which at once ensures a regular supply of coal to the breaker and to the plant, and prevents risk of injury to the workmen. It is elevated, conveyed, and distributed in the coal bunkers above the retort bench by a West lip-bucket conveyor, for which no mechanical filler is required.

From the bunkers the coal passes through the rotary coal valve to the coal-feed hoppers of the retorts. These hoppers are in direct communication with each retort, and the coal passes automatically to the retort at a rate which is regulated by the speed at which the coke is continuously withdrawn from the base of the retort by means of the Glover-West helical coke extractor.

Coke for the producers and for the supply of the retorts, when commencing to work after scurfing, is dealt with by the same conveyor. The main bulk of the coke is discharged into skips handled by an overhead mechanical runway.

RESULTS.

Average Results over Three Months ended Feb. 28, 1925.

Coals Carbonized.	P.Ct.
Staffordshire	22
Derbyshire	60
Yorkshire	18

Number of retorts working (average)	7·68 per day.
Coal carbonized	3257·15 tons.
" " per retort per 24 hrs.	4·71 tons.
Gas made (corrected), total	6,496,800 c.ft.
" " per retort per 24 hrs.	94,020 c ft.
Therms per retort per 24 hrs.	414
" per ton of coal carbonized	87·88
Coke and breeze saleable per ton of coal carbonized	9·07 cwt.
Tar produced per ton of coal	15·66 gallons.
Liquor " " " 10 oz.	38·5 gallons.

Main Details of Test on Glover-West Vertical Retorts commencing at 12 noon on Feb. 26, 1925, and ended at 12 noon on March 4, 1925.

COAL.

The coals carbonized were a mixture of:

	P.Ct.
Staffordshire	29
Derbyshire	61
Yorkshire	10

The proximate analysis of the average sample was:

	P.Ct.
Moisture	7·5
Volatile combustibles	32·8
Ash	5·5
Fixed carbon	54 2

YIELD OF GAS AND RESIDUALS.

Number of retorts working	7
Throughput per retort per 24 hours	4·76 tons.
Gas made per ton (corrected)	20,120 c.ft.
Calorific value (gross)	450 5 B.Th.U.
Gas made per retort per 24 hours	95,743 c.ft.
Therms per ton of coal carbonized	90·64
" " retort per 24 hours	431
Coke and breeze saleable per ton of coal carbonized (3 months' average)	9·07 cwt.
Tar per ton (average for February)	15·2 gallons.
Liquor, 10 oz., per ton (average for February)	40 gallons.

ANALYSIS OF GAS, averaged over the period of test.

	P.Ct.
CO_2	4·4
C_nH_m	1·9
O_2	0·4
CO	17·8
CH_4	18·6
H_2	50·4
N_2 (by diff.)	6·5
Calculated calorific value	449·4 B.Th.U.
Observed calorific value	450 "

COKE.

	P.Ct.
Over 1 in.	84·4
Through 1 in..	16·6

It is officially announced that the Prince of Wales has accepted the presidency of the British Association for the Advancement of Science for the Oxford meeting in 1926. The Prince Consort, whose precedent the Prince of Wales will follow, presided over the Association in 1859, at Aberdeen. Prof. Horace Lamb is to preside over this year's meeting in Southampton from Aug. 26 to Sept. 2.

MIDLAND JUNIOR ASSOCIATION DINNER.

The Midland Junior Gas Association had a dinner at the Imperial Hotel, Birmingham, last Thursday, with Mr. HARRY CLARK, of Derby (President), in the chair. The large attendance included Mr. J. Ferguson Bell (the President of the Institution of Gas Engineers), Mr. A. W. Smith (the General Manager and Secretary of the Birmingham Gas Department), Mr. R. G. Shadbolt, and a number of old members.

The toast "The King" having been duly honoured,

Mr. L. H. THOMAS proposed "The Institution of Gas Engineers," with which was coupled the name of Mr. Ferguson Bell. He said it was essential, if they were to improve thermal efficiency and to produce satisfactory gas at the cheapest possible price, that they should be kept fully informed of the latest scientific results. They were able to pool their experience of all kinds for the benefit of all.

Mr. J. FERGUSON BELL, in response, referred to the Institution of Gas Engineers' scheme for the education and certification of those engaged in the gas industry. The final proof of the examination syllabus had just been issued and approved by the Council, and a Board of Managers, with Consultation Committee, had been approved. They would be glad to know, moreover, that the National Gas Council had voted £1000 towards the cost of carrying on the scheme. [Applause.] Thanks were due to Mr. Milne Watson and other members of the Council for their support. The scheme was an earnest effort on the part of the Institution to enable those engaged in the industry to equip themselves for their work. He invited all the Junior Associations to accord the scheme their cordial support, and was pleased to say that the Education Committees in the larger towns were giving their aid.

Mr. R. G. SHADBOLT, in proposing the toast "The Midland Junior Gas Association," referred to its inauguration, and observed that 65 members attended this. The men associated with the Birmingham Gas Department had contributed very largely to the proceedings, and the Department had encouraged the Association by placing a room at their disposal. He felt sure that the future was full of promise if each member would do his bit according to his opportunities and ability.

The CHAIRMAN, in response, said he desired warmly to acknowledge the help the Association had received from the seniors. The membership to-day was 219.

The toast "Visitors and Honorary Members" was proposed by Mr. W. J. PICKERING (Past President, Coal Test Works, Birmingham).

Dr. E. W. SMITH, in replying to the toast, said that an important factor contributing to the progress of the gas industry was a reduction in the price of gas; and because of this they should not neglect coke. Many undertakings did not appear fully to appreciate the importance of screened and dry coke. Too little was being done in the boosting of coke; and he would like to see demonstrations of the possibilities of coke at the Wembley Exhibition. This could be successfully done; and he believed the results would occasion surprise to the general public.

Mr. C. F. TOOBY (Coventry), Junior Vice-President of the Association, in proposing "The Birmingham Gas Department," pointed out that the Department occupied a very proud position in the gas industry, for, having an output of approximately 13,000 million c.ft. per annum, and serving nearly 200,000 consumers, it came next to the great London Companies. A progressive spirit pervaded its policy from carbonization to distribution and sales. He thought the City of Birmingham was to be congratulated on its Gas Department.

Mr. A. W. SMITH, General Manager and Secretary of the Birmingham Gas Department, remarked that he had always taken a very keen interest in the work of the Midland Juniors, and had been very gratified to note the development of the Association and the quality of the papers and discussions. In the early days they had to contend with a certain amount of prejudice from a few of the older and more conservative engineers; but this was a phase of the past. So long as the Association continued to do the good work it had performed in the past, it could depend upon the sympathetic help of the Birmingham Gas Department.

Lime for Thawing Pipes.

Should it be desired to draw frost from frozen ground, in order to get at a pipe beneath, there has been a "wrinkle" given in the "American Gas Journal" which may prove of service. At the spot where it has been determined to dig, fix up the size of trench desired, and pick out the frozen surface to a depth of 8 or 10 in. In the hole place enough unslaked lime to form a good thick bed. If possible, do all this in the evening, and on leaving throw such a carefully judged quantity of water over the lime as will keep it "working" for the longest period during the night. A quantity of straw and a canvas covering should be placed over the whole, weighting it down at the edges to keep the heat in, and then left until the next morning. Upon then returning, it will be found that the heat generated by the working of the lime over night has drawn the frost out of the earth in and around the hole to a depth of from 2 to 4 ft., and that digging to the pipe is thus rendered comparatively easy. This device is not a speedy one; but it is safe, cheap, and convenient. When it is decided to dig at a certain point the following day, it can be planned for and started the night before, and no time is lost; nor are the services of a watchman required. As no fire is used, the plan has the merit, moreover, of avoiding the danger of igniting any possible escaping gas from a broken main beneath; and it is cleaner than where steam is used for the purpose of thawing—turned in through a hose into a drill hole.

CONSTRUCTION OF A SPIRALLY GUIDED GASHOLDER AND TANK AT GARSTON.

By E. Astbury, Assoc.M.Inst.Mech.E.

[A Paper before the Liverpool Engineering Society, March 4.]

A description is here given in detail of the construction of a gasholder and tank at the Garston Works of the Liverpool Gas Company, on which the author has been engaged under the direction of the Engineer of the Company, Mr. R. E. Gibson, M.Inst.C.E., the President of this Society.

In the autumn of 1923, it was decided to erect a gasholder of about 2 million c.ft. capacity; and a suitable position for same having been selected, a number of trial holes were made in the ground in close proximity to the site, in order to ascertain the nature of the strata in which the excavation for the tank had to be made. These were found to consist of shallow layers of earth, clay, and sand superimposed on soft red sandstone rock, which was reached at an average depth of 7 ft. below datum. As the depth of the tank was to be 37 ft., practically four-fifths of it had to be constructed in sandstone rock, which forms an excellent foundation. Drawings and specifications were prepared for an annular brick and asphalt tank, and for a gasholder of the required capacity, and contracts were placed.

The Tank.

The finished dimensions of the tank are 152 ft. 6 in. inside diameter and 36 ft. deep, measured from the bottom of the tank to the top of the concrete coping. The diameter of the core or "dumpling" is 116 ft. 6 in. at the top and 132 ft. 6 in. at the base, the wall having a batter of 16°.

The details of the brick walls and concrete work, with the asphalt which was used to render the tank watertight, are given in fig. 1. In setting-out the position of the excavation, instead of employing a trammel, which is often used, the following method was adopted.

A strong wooden post was fixed in the ground in the middle of the site level with the coping, with an iron spike driven vertically into its top. This served as the centre of the tank and for the inner and outer circumferences of the circular trench—the outer circumference coinciding with the outside of the brickwork of the side walls of the tank, and the inner with that of the top of the core or dumpling. All measurements were made with a steel tape, and the work carefully pegged out. All the pegs—which were similar to the centre one—for the outer circle were set to a radius of 86 ft. 3 in., or 6 ft. outside the excavation, and were surrounded with a mound of concrete to prevent their being disturbed while the construction of the tank was in progress. The radius was marked on the top of each peg by a saw cut about 1 in. deep. From these, with the aid of gauges, the circle of the excavation was set out, and also the diameter of the side walls checked as the building proceeded. The circumference of the top of the core or dumpling was pegged out and checked in a similar manner.

To handle the spoil as excavated, a circular track was put down outside the tank, and on this travelled two steam cranes which lifted small tipping wagon bodies when loaded with spoil, and deposited them on a 24-in. gauge light railway, on which they were hauled by a small petrol locomotive to a bank about 100 yards from the tank, where the spoil was tipped. While the trench was being excavated, the rock on both sides was carefully plumbed and trimmed with saw picks, so as to present a perfectly true surface for the reception of the brickwork. The mass of rock between the two faces was removed with pneumatic picks and drills, and by blasting with 4-oz. or 6-oz. charges of "Samsonite" or "Rockite"; special care being taken that none of the adjacent rock side was damaged or shaken. As this work proceeded, it was found that the nature of the sandstone rock varied considerably—some layers being hard, others soft, and many places containing thin seams of sand and clay. Also the strata were very irregular in thickness; and instead of lying horizontally, some were tilted at angles varying from about 30° to almost the vertical position.

On the north-east side of the tank there were several large fissures in the rock, which was also cracked and divided-up into irregular pieces, some with veins of sand, from which flowed small but continuous streams of water, gradually carrying the sand into the excavation, thereby loosening the rock and causing shelling off in several places. To prevent falls of rock taking place, a number of shoring timbers 11 in. wide and 3 in. thick were placed against the face, and strutted with stout poles from the core opposite.

Although no large quantity of water was met with, there was, in addition to those already mentioned, a number of small jets issuing from the sides at several points around the excavation, where the rock was very porous. The water was drained to sumps, from which it was removed by manual or electrically driven pumps. It was therefore unnecessary to sink a specially deep sump or to have pumps continuously at work in order to keep down the water. Two recesses were made in the side and core and in the bottom of the tank in diametrically opposite positions, to receive the inlet and outlet gas mains.

On the completion of the excavation, provision had to be made to deal with the inflowing water during the building of the tank and prevent the risk of pressure due to the head of an accumulation of water in any part either below the bottom or behind the brickwork of the sides, causing a fracture in the floor or walls, and thereby a leak. This is often a source of trouble in gasholder tank construction; and it must be remembered that, where water can enter, it can also make its exit when the tank is full. Hence the necessity for taking special care in making the tank watertight.

A trench about 9 in. wide was taken out on the centre line of the bottom of the tank, and in it were laid earthenware land drain pipes 4 in. internal diameter, with open joints, and surrounded with loose brick rubble, to allow the free percolation of any water into the pipes. These drains led to the recess already made in the bottom of the tank for the outlet gas main, and this served as a sump from which the water was pumped when necessary. At the outlet end of each drain a 4-in. bore cast-iron flanged pipe was fixed, embedded in concrete; and this was closed with a blank flange, and covered with asphalt and brickwork on the completion of the tank, previous to putting the gas main in position.

The floor or bottom of the excavation was first covered with a layer of concrete 5½ in. thick, having a composition of 5 parts broken bricks, 2 parts clean river sand, and 1 part portland cement. The concrete was prepared in a mechanical mixer, discharged into barrows, wheeled, and tipped on the position where it was required; afterwards being levelled and well rammed down. Upon this the brickwork of the outer ring of the side wall of the tank and of the inner ring of the circular wall of the core or dumpling was commenced. Each ring was built in contact with the face of the rock to a height of about 4 ft., and consists of a wall 9 in. thick built of well-burned red bricks set in English bond with portland cement mortar (2 parts sand and 1 part cement).

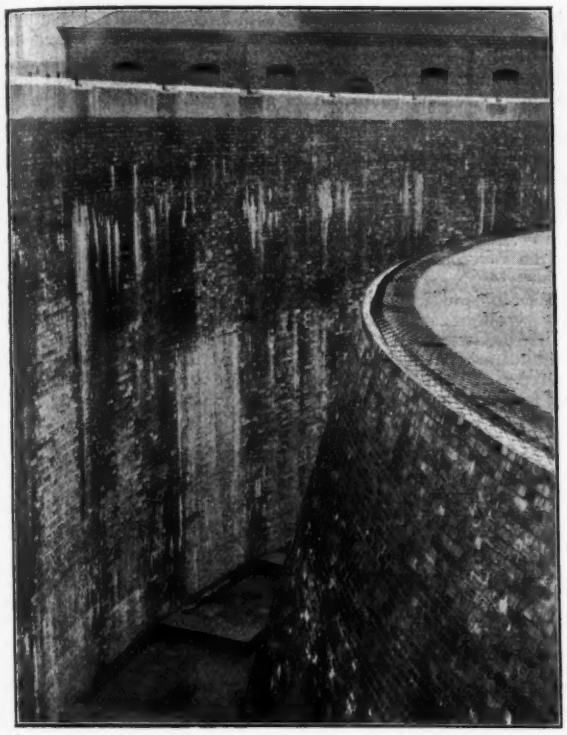
All interstices or irregularities between the brickwork and the rock were solidly filled-in with grout, concrete, or brickwork set in cement as the work proceeded. To ensure the tank being watertight, asphalt was used, composed of 15 p.ct. of Trinidad Lake bitumen and 85 p.ct. of aggregate. The 15 p.ct. bitumen consisted of refined bitumen to which was added not more than one-fifth by weight of standard flux, to bring the bitumen to the required consistency. The aggregate was ground to a fineness which yielded the following grading when tested by sieving:

	P.Ct.
Passing 100 mesh sieve, not less than	35
,, 50 ,, ,, ,,	20
,, 30 ,, ,, ,,	25
Retained on 30 mesh sieve, and all passing 10 mesh sieve, not more than	20
	100

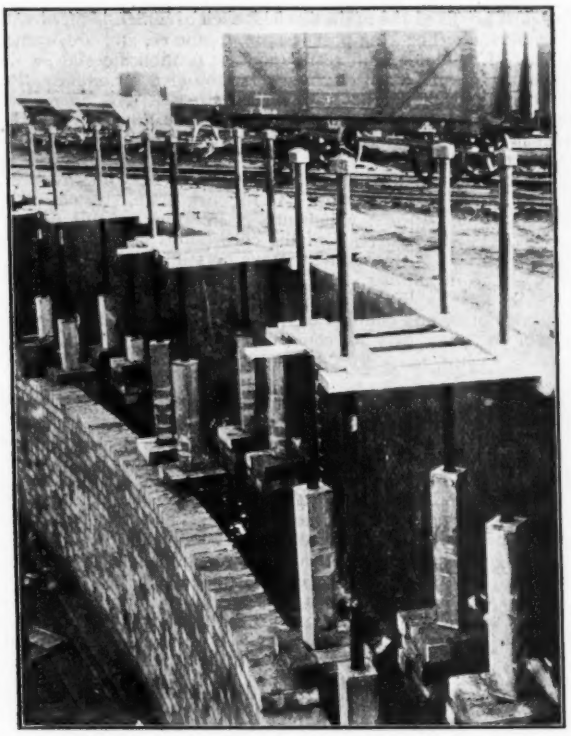
The bottom of the tank and the surface of the walls were rendered with this asphalt ¾ in. in thickness, which was applied in two layers, each ⅜ in. thick. The first was put on with a trowel, and the surface left rough so as to obtain a perfect bond with the second, which was applied and worked with an oak spatula; the finished surface being smooth and homogeneous. Special care was taken that any joints in the work of the first layer were covered by the second layer; and a regular overlap of about 6 in. was arranged for all the joints in the asphalt throughout the tank, so that no joint in both layers coincided, thus minimizing the risk of leaks. To strengthen the joints between the horizontal layer on the bottom and those of the side walls of the tank and core, the asphalt there was shaped to form a fillet. The bottom of the tank was then completed by a 5½ in. layer of concrete laid on top of the asphalt; the finished surface being left true and level ready to receive the rest blocks for the holder. The bottoms and sides of the recesses for the inlet and outlet gas mains were constructed in the same manner as those of the tank.

In previous brick and asphalt tanks constructed for the Liverpool Gas Company, the 9-in. wall was built against the face of the rock to a height of about 5 ft., and when this was completed another ring of 9-in. brickwork was built within it. This inner ring was carried up two courses at a time, with a space of 1 in. left between the two rings of brickwork, to be filled with coal tar asphalt, which was run in hot. It was found desirable to pour in the asphalt at every two courses, so that the upper surface of each layer of asphalt might be thoroughly cleared from any sand or cement that might fall on it during the execution of the work. By taking this precaution, a uniform sheet of asphalt was formed, which is necessary to make the tank watertight. The method adopted in the present tank was found to be an improvement; for the asphalt could be applied more quickly to larger areas, and the work more easily inspected.

The inner rings of brickwork of the side walls of the tank and core were then built 9 in. thick against the face of the asphalt, thus forming walls each consisting of two separate and concentric rings of brickwork with a layer of asphalt between. Scaffolding was erected as required within the tank for the bricklayers and other workmen engaged on the brickwork and asphalt. In building the inner ring of the side wall, the bricks were set to wooden templates, each about 14 ft. long, made to the proper curve on their outer edge, in order to ensure that the required radius of the tank was adhered to. Also the walls were frequently plumbed, and the dimensions checked—the inclination of that of the cone being set to a battering plumb rule.



Part View of Tank showing Reinforcement for Concrete Cover of Dumpling.



View showing Construction of Upper Part of Side Wall of Tank, and Space left between Front and Back of Wall for Concrete Filling.

This method of procedure was repeated until the outer wall approached to within 1 ft. 6 in. of the upper surface of the sandstone rock, when the inner ring was increased to four bricks thick—the outer 9-in. ring, with the layer of asphalt, being set over in two steps, as shown in fig. 1. The wall is carried up this thickness to 2 ft. below datum, and the holding-down bolts and plates for the tank carriages and guide rollers of the holder were built-in as the work proceeded.

Owing to the difficulty of obtaining sufficient bricklayers to make satisfactory progress with the work, it was decided to modify the construction of a considerable portion of the upper part of the side wall of the tank. Instead of the solid brickwork shown in fig. 1, a 9-in. inner wall was built to the proper curve of the tank, and the space thus formed between this and the outer 9-in. wall carrying the asphalt was filled with concrete. The top is finished off with a granolithic coping 2 ft. thick and 3 ft. 11 in. wide, with recesses left for the cast-iron bases of the tank carriages and rollers. A cast-iron overflow pipe was embedded in the coping as the concrete was placed in position. This was set so that the level of the water in the tank, when full, was 6 in. below the top of the coping.

The top of the core or dumpling was next dealt with, and the earth, clay, &c., removed from the surface until the sandstone rock was reached. As the top of the coping of the tank was nearly 5 ft. above the existing level of the surrounding ground, the earth and clay from the core was used to form a backing or embankment behind the wall. This was carefully carried up in horizontal layers of 1 ft. deep, and well rammed; no rock, broken stone, or sand being used.

The level of the surface of the rock was reduced until the top of the core was 9 ft. 3¾ in. below the coping of the tank; and it was then covered with a layer of concrete 3 in. thick, the portion round the circumference resting on the inner 9-in. brickwork of the circular wall surrounding the core. On the concrete a layer of asphalt ¾ in. thick was laid; special care being taken in joining-up the asphalt of the side wall. The crown of the core was finished off with a layer of concrete 3 in. thick, which was reinforced around the top edge with expanded metal, thus forming a strong curb.

Four 1½-in. pipes were inserted in the top of the dumpling, to relieve any pressure that might accumulate under the concrete. These were filled with cement grout and plugged when the tank was being filled and the water practically level with the top of the dumpling. In the centre of the core a granolithic slab 5 ft. square and 12 in. thick was placed, to receive the king post of the gasholder crown; also on the bottom of the tank 36 granolithic stones 6 ft. 6 in. long, 2 ft. wide, and 12 in. deep, were set, on which the gasholder rests when out of action.

The inlet and outlet gas mains were next put in position, and the brickwork and asphalt completed where these pass through the wall of the tank. The recesses in the walls and bottom of tank were then filled with concrete enclosing the mains; and the vertical face inside the tank was curved to the same radius as the wall and coping, thus completing the circle of the tank. On checking the dimensions of the finished tank, it was found that at no point in the circumference did the radius differ from that specified by more than ¼ in.

When the building of the side wall of the tank had almost reached ground level, it was noticed that a patch of brickwork about 3 ft. in diameter and 9 ft. above the bottom of the tank was faintly discoloured by a stain of light brown colour, and daily examinations afterwards showed that the colour was gradually becoming darker. On cutting out the brickwork from the front 9-in. wall, so as to expose about a square foot of the asphalt, it was found that water containing traces of paraffin was coming through the asphalt, which had become quite soft, some of it being almost liquid; and it was this that was causing the discoloration. Close to the tank at this point was a site that had until recently been occupied by an underground boiler tank for storing paraffin; and there had evidently been a slight leakage of this oil, which has now been carried by a small stream of water through the porous sandstone rock to the brickwork of the tank wall.

In order to prevent further damage to the asphalt, a 9-in. borehole was made about 5 ft. from the outside of the tank opposite the point where the defect had shown itself. The borehole was 46 ft. deep, and the water which collected in it was removed by a deep well pump. A few days after the pumping was started, the wall of the tank where the asphalt was exposed became quite dry, showing that the borehole was intercepting the stream carrying the paraffin; also traces of the latter were visible in the water delivered by the pump. After being kept under observation for several weeks, during which no water or oil appeared in the inside of the brickwork, all the damaged asphalt was removed and replaced by new. Regular attention has since been given to the pumping, and there has been no further sign of the trouble.

The Holder.

The holder is a telescopic one, consisting of four spiral-guided lifts. The following are the principal dimensions:

	Diameter.	Depth.	No. of Rails.
Inner lift . . .	142 ft. 4 in. ..	34 ft. 6 in. ..	18
Second lift . . .	145 ft. 0¼ in. ..	34 ft. 4 in. ..	24
Third lift . . .	147 ft. 9⅜ in. ..	34 ft. 4 in. ..	36
Outer lift . . .	150 ft. 6⅝ in. ..	34 ft. 4 in. ..	48

The total height of the holder, when fully inflated, is 140 ft. above the top of the tank coping.

The crown of the bell of the inner lift is curved to a radius of 250 ft., which gives a rise of 10 ft. 6 in. from the curb to the centre. It is supported by an internal trussing similar to the framing of an umbrella. This trussing consists of a crown plate and centre column or king post, from which a number of main T-bar rafters radiate at equal distances apart from the top curb, each being stiffened by struts and tension rods. There are also secondary trusses extending from the top curb to nearly half the radius of the bell, and placed midway between the main rafters. These and the main trusses are braced together by angle-iron trimmers or purlins.

Between the curb end of each main rafter and the base of the

king post are fixed the main tie rods, each of which is fitted with a turnbuckle. The king post is 24 in. diameter, and constructed of ⅜-in. M.S. plates, and rests upon the granolithic slab in the centre of the tank when the holder is grounded for examination or repairs. It should here be pointed out that it is only when the holder is empty that the crown requires any support; for when it is inflated, the internal pressure of the gas is sufficient for this purpose.

The top curb is constructed of two rings of 5 in. by 5 in. by ½ in. angles with an 11 in. by ⅝ in. curb plate, riveted to the crown and side sheets, which are $\frac{7}{16}$ in. thick at this part of the bell. To the underside of the curb plates are attached, by means of brackets, the vertical stays or stiffeners for the side. These are 36 in number, each consisting of an 8 in. by 5 in. by 28 lbs. H joist extending the full depth of the lift, and secured to the side plate and channel of the hydraulic cup. The vertical stays of the outer lifts are constructed of 6 in. by 2½ in. 12-lb. channels with a 2½ in. by ⅜ in. angle riveted to each flange of same.

The hydraulic cups of the inner lifts are each 10 in. wide and 1 ft. 9 in. deep, and the grips or dips are 10 in. wide and 2 ft. deep. Both cups and grips are built of 10 in. by 3½ in. channels with $\frac{7}{16}$-in. plates for the two inner and ⅜-in. plates for the outer lifts; the edges of these being stiffened with a 2½ in. by ⅜ in. flat iron bead. The lower ends of the vertical stays are attached to the channels of the cups by means of brackets formed of ⅜-in. plate. They are also secured to the top and bottom rows of side plates by ¾-in. diameter rivets and bolts.

Where the stays join the grips, the end of each vertical channel is turned-over to form a knee, which supports, and is bolted to, the web of the grip channel, thereby strengthening it. Around the inside of each cup channel are riveted a number of rest blocks made of 3 in. by 1 in. flat iron, which receive the beaded edge of the grip plate as each lift of the holder cups. At the bottom of the outer lift a curb is formed consisting of two rings of 6 in. by 4 in. by ⅝ in. angles, and one 9 in. by ½ in. curb plate attached to the bottom row of side plates, which are ⅝ in. thick, by ¾-in. rivets. The sheeting of the holder, both for the crown and sides, is mainly of ⅜-in. plates, excepting the rows next to those of the curbs, cups, and grips, which are $\frac{7}{16}$ in. thick. The joints in the sheeting are made gastight with stout linen tape, which has been soaked in red lead and boiled linseed oil, and is inserted in the lap before riveting.

To the outside of the sides of the lifts are attached the spiral guide rails, which are riveted to 12 in. by ⅝ in. rail plates, fixed at an angle of 45°. These rail plates extend the full depth of each lift, and are let into the side sheets, and at the points where they intersect the vertical stays are bolted to same by cup-headed bolts. This strengthens the sides, and ensures the guide rails being perfectly rigid, which is essential if the rollers are to work properly.

At equal distances apart, around the tank coping, are 48 carriages with guide rollers. The carriages and base plates are firmly held in position by the holding-down bolts and plates already mentioned in describing the tank. The carriages, which are of cast steel, form with their caps two bearings, in each of which a steel turned axle 3½ in. in diameter is fitted, and rotates freely. Lubrication is provided in the usual manner. On one end of the axle a steel roller is fixed and secured with countersunk set screws, so that the roller is not free to revolve on the axle. In the rim of each roller, which is also of cast steel, is turned a groove through which the flanged head of the guide rail of the outer lift passes, being engaged by a roller on either side.

To allow a little end play for radial expansion and contraction in the bell of the holder, due to variations in temperature, a space ¾ in. wide is left between the guide roller and the front of the carriage.

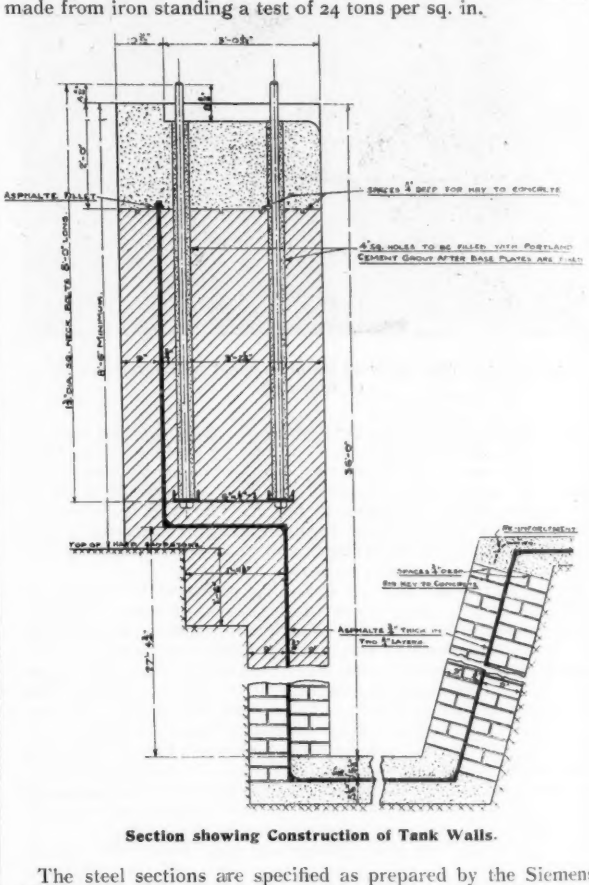
With regard to the carriages and rollers which are attached to the holder itself, these are also of cast steel, and bolted to the tops of the grip channels of the second, third, and outer lifts. The carriages differ in construction from those fixed around the tank, being cast in one piece and bored-out to fit the axles. These axles are fixed, and the rollers free to revolve on them. It will be readily appreciated that each pair of rollers must be carefully adjusted to the guide rail, so that they take a share of any strain to which the holder may be subjected.

In order to prevent snow or ice from interfering with the smooth working of the rollers and guide rails, a cast-iron snow shield is fitted to each carriage. One end of this shield forms a cover to the roller engaging with the upper side of the rail, and the other is turned-up and acts as a scraper to remove any snow or ice from the flanged head of the rail when the holder is descending.

Two manholes of the Livesey pattern are fixed in the sheeting of the crown of the inner lift—over the inlet and outlet gas mains respectively, to facilitate the inspection of same. There is also one manhole and cover of the ordinary type for use when it is necessary to enter the holder itself. Handrails are fixed around each grip, so that the guide rollers and carriages can be examined and lubricated independent of the position of the holder. Ladders are attached to the outside of each lift, and give access to the crown and grips.

All wrought iron and steel work received a coat of good hot boiled linseed oil at the contractors' works, to preserve the surfaces of the plates, &c., from rust; and all joints of the sheeting during erection will be painted with two coats of red lead paint. Immediately after erection, the whole of the holder externally is to be given two coats of best oxide paint. The author regrets that owing to delay in the completion of the tank due to labour disputes, &c., he is unable to give a fuller description of the erection of the holder, as this work was only recently commenced.

Special attention should be drawn to the fact that the plates used in the construction of this holder are of wrought iron. As pointed out by Mr. F. G. Martin, B.Sc., in his valuable paper recently read before this Society, wrought iron resists corrosion better than steel; and this is proved by some of the gasholders at the Liverpool Gas Company's works, which were built about 60 years ago. The plates of these are still in excellent condition. All $\frac{7}{16}$ in. and ⅜ in. diameter rivets are also of wrought iron. The wrought iron is specified to be of best quality, and to stand a tensile strain of 21 tons per sq. in., with a contraction of original area at fracture of 18 p.ct. with the fibre and 18 tons and 8 p.ct. across the fibre. The bolts and rivets are to be made from iron standing a test of 24 tons per sq. in.


ASPHALTE FILLET
SPACES 4" DEEP FOR MIX TO CONCRETE
4" SQ. HOLES TO BE FILLED WITH PORTLAND CEMENT GROUT AFTER BASE PLATES ARE FIXED
TOP OF HOLDER BASE PLATES
ASPHALTE ½" THICK IN TWO ¼" LAYERS

Section showing Construction of Tank Walls.

The steel sections are specified as prepared by the Siemens-Martin process, to stand a tensile strain of not less than 28 tons or more than 32 tons per sq. in., with an elongation of 20 p.ct. in 8 in. Steel rivets and bolts are to have a tensile strength of not less than 25 tons per sq. in., and show an elongation of 25 p.ct. in a length of 8 in. Samples of both wrought iron and steel taken at the rolling mills were found in every case, when tested, to fulfil the above requirements.

The holder is designed with a factor of safety of 4, to withstand a wind pressure of 40 lbs. per sq. ft., which is equivalent to a gale with a velocity of about 90 miles per hour. The total weight of the bell is about 612 tons; and the various weights of the materials used in the holder and carriages are as follows:

Wrought iron	267 tons,
Mild steel	300 ,,
Cast steel	15 ,,
Cast iron	41 ,,

The inner lift throws a pressure equal to 5·85 in. of water, and when the second lift is cupped this pressure is increased to 9·12 in. There is further increase to 12·37 in. and 15·43 in. with the cupping of the third and outer lifts respectively. It will be noted that the holder throws a higher pressure than is usual for one of similar size; but this extra pressure is provided to enable the Garston Works to deliver gas into the holders at the Wavertree and Caryl Street Works without the assistance of boosters. At the present time the whole of the gas sent out from the latter two works is received through a special trunk main from Garston.

In conclusion, the author desires to express his thanks to Mr. R. E. Gibson, the Chief Engineer to the Liverpool Gas Company, for his kind permission to include the details and particulars given in this paper, and for his advice in the preparation of same; also to Mr. Fletcher, Mr. Nicoll, Mr. Oldfield, and other members of the staff, for their assistance.

SCOTTISH JUNIOR GAS ASSOCIATIONS.

Joint Visit to Lime Wharf Chemical Works, Falkirk.

The annual joint visit of the Eastern and Western Districts of the Scottish Juniors was made on Saturday, March 14, to the tar and chemical works of Messrs. James Ross & Co., Ltd., Lime Wharf, Falkirk. The party, which numbered about a hundred, were received by the Managing Director of the firm, Mr. Francis Tudsbery, C.B.E., who, together with Mr. Ross and other principal members of the staff, conducted the visitors over the works. These cover an area of 40 acres, and were laid down in 1845. To-day Messrs. Ross & Co. are the largest firm of tar distillers in Scotland.

The visitors were impressed with the exceptional facilities for unloading and emptying crude tar. The London and North Eastern Railway pass on one side, while the London, Midland, and Scottish Railway and the Forth and Clyde Canal are on the other. The sidings come into the centre of the works. These facilities, of course, are available for dispatch; and it may be mentioned that 1000 barrels and numerous tank wagons can be sent out each day. The tar is received at the unloading bank, and run into large storage vats capable of holding 300,000 gallons. There is also storage for 1½ million gallons adjacent to the stills, which number twenty-five.

The view of tar distillers is that the use of tar alone for road purposes is on the decline, and that bitumen and tar-bitumen compounds are rapidly taking its place. In discussing the values of crude tar and refined products, it was ascertained that, taking the whole twelve months, the proportion of tar which is sold for road purposes is comparatively small, and that the bulk of crude tar received goes out as pitch and oil. The visitors were able to see the process and plant in the manufacture of refined tars, creosote oils, pitch, road tars, and the tar-bitumen compound known as "Rossphalte." The firm manufacture carbolic and cresylic acids, solvent naphtha, pyridine, &c., and also sulphate of ammonia.

After the inspection, the visitors were entertained to tea by the firm.

VOTE OF THANKS.

Mr. JOHN M'ISAAC, President of the Western District, expressed, on behalf of all present, their thanks to Messrs. Ross & Co. It was not often, he said, that the Juniors visited works of this nature; and he assured the firm that they appreciated the courteous way in which they had been received.

Mr. J. LAING (Brechin), President of the Eastern District, also spoke in appreciation of the firm's generous hospitality.

Mr. ROSS, in reply, mentioned that this was the first occasion on which the firm had been honoured by a visit from the Scottish Juniors.

The next meeting of the Western District will be held in the Royal Technical College, Glasgow, on Saturday afternoon, March 28, when two papers will be read—one by Mr. John M'Intyre (Glasgow) on "Selecting and Testing Wrought-Iron Pipes," and the other by Mr. R. Blakey (Stirling) on "Thermal Balance-Sheets."

Gasholder Patches.

The repair of a ragged tear in the side of a holder, by putting on a complete patch, is described in a "wrinkle" appearing in the pages of the "American Gas Journal." A temporary patch was applied while a sheet-iron plate of suitable size was being prepared. The exact size of the plate and the location of every bolt in it were then marked-out on the holder sheeting around the rent. The holes were drilled by a "breast" hand drilling machine and twist drills, and as each one was finished small wooden pegs previously prepared (the exact size of the holes) were driven in, to prevent escape of gas into the face of the workman drilling. On the joints of the holder sheets where the heads of the old rivets would interfere with the patch being drawn-up tightly against the sheets, the rivets were cut off, the shanks knocked inside the holder, and the holes so left filled by pegs in the same manner as the new holes. When all holes were drilled, the new patch was placed in position (without removing the canvas which constituted the temporary patch), and secured by small knee bolts. These bolts were ordinary "carriage bolts," with the heads cut off, and the ends bent at a right angle. The bolts being slightly smaller in diameter than the holes were dexterously slipped through the thin sheets into position, one after another. A string attached to each prevented the bolt from being pushed in, and falling inside, when starting to put the nut on. After all were in position, packing and red lead were placed between the holder sheet and the plate, and a washer was provided for each bolt.

Anthracite Storage.—It is pointed out by Mr. W. S. Parr, of the University of Illinois, in a paper presented to the Section of Gas and Fuel Chemistry of the American Chemical Society, that anthracite has a minimum capacity for oxygen absorption, and can be stored substantially in any quantity without deterioration or danger of loss from spontaneous combustion.

THE COKE COMPETITION.

In our contemporary "Fuel in Science and Practice" for March, among the "Notes" contributed by Mr. R. Wigginton is one on the "Coke Competition." The scheme is presented in such an interesting and concise manner that we reproduce the article:

Coke is the most important bye-product in the manufacture of coal gas; and the gas industry is largely dependent on the revenue derived from its sale. In the early days of gas manufacture, when low carbonizing temperatures were the rule, a free-burning product was obtained, which became quite popular for domestic heating, and was also used pretty extensively on the railways, to the great advantage of the travelling public. Unfortunately, later developments, while increasing the dependence of the industry on coke sales, have tended to restrict the market for the coke. Use of higher carbonizing temperatures, made possible by the introduction of the gas exhauster and the use of fireclay retorts instead of iron retorts, gives a coke of lower combustibility which is less readily disposed of; it is also possible that the practice of steaming gas-retorts, by introducing a preferential gasification of the most readily combustible portion of the coke, may tend to accentuate this defect.

It is not often that a technical journal is in a position to offer its readers the chance of taking part in a prize competition relating to a subject of special interest to them. We therefore think it important to draw attention to the coke competition announced in the "GAS JOURNAL." This has been made possible by the generosity of the Woodall-Duckham Companies, who have provided £1000 to be spent in promoting the general welfare of the gas industry by collecting information and opinions concerning the production and utilization of gas coke. The donors, beyond stipulating that the contest shall be open to everyone who cares to enter, have relinquished all control over the organization of the competition and the award of the prizes. This will be in the hands of the Editor of the "GAS JOURNAL" (Mr. A. F. Bezant), assisted by Messrs. A. W. Smith (General Manager of the Birmingham Corporation Gas Department) and W. B. Leech (Engineer of the Beckton Gas-Works, Gas Light and Coke Company). The impartiality of this Committee is beyond question; but, as an additional safeguard, it has been decided that all entries shall be signed only by a *nom de plume*, the real name and address of the competitor being contained in an accompanying sealed envelope which will not be opened until a decision has been made. Moreover, except with first-prize winners, the identity of all competitors who so desire will be kept secret.

Thus fair play for everyone is assured; and it is hoped that everyone who has anything of value to contribute will take part in the competition, regardless of whether the prize money attracts him or not. Only in this way can the donors have the satisfaction of seeing the industry reap the full benefit of their liberality.

For full details of the scheme, the "GAS JOURNAL" must be consulted. It may be stated, however, that competitors are invited to submit essays on one (or more) of the three subjects of:

(1) Coke production.
(2) Coke preparation.
(3) Sale and utilization of coke.

In each section, provided the number and merit of the entries are sufficient, prizes will be awarded as under:—

Section I.	£	Section II.	£	Section III.	£
First prize	200	First prize	100	First prize	100
Second prize	75	Second prize	50	Second prize	50
Third prize	50	Third prize	25	Third prize	25
12 prizes of	10	10 prizes of	10	10 prizes of	10

All entries must be in English, and type-written, and sent in before June 30 next. The same competitor may win prizes in all three sections. Winning papers will be published in the "GAS JOURNAL."

We wish our contemporary every success in its new enterprise, which we trust will be an example to those interested in other fuel-using industries.

Wales and Monmouthshire Junior Gas Association.—On Saturday afternoon next (the 21st inst.) there is to be a meeting at the new Morriston Gas-Works, Swansea, at which, in addition to the tour of inspection, Prof. F. Bacon, M.A., Assoc.M.Inst.C.E., of the University College of Swansea, will address the members. Tea will be provided by the Chairman and Directors of the Swansea Gas Light Company.

Tankless Gasholder at Michigan City.—A tankless gasholder which has just been completed for the Northern Indiana Gas and Electric Company at Michigan City has a capacity of a million c.ft., and is 105 ft. in diameter and 160 ft. in height. Visitors from various parts of the United States and Canada, as well as from Japan, inspected the holder while it was in course of construction. It has been designed so that an addition may be made to it if needed at some future time. Another 50 ft. may be put on to it, bringing the total height up to 210 ft., and making the capacity 1,350,000 c.ft.

GAS EQUIPMENT IN STEEL HOUSES.

In order to supply quickly and cheaply the thousands of homes that are so sorely needed by the artisan class at the present moment, numbers of all-steel houses are being erected by unskilled labour in various parts of the country. A good example of the all-steel method of construction is furnished by the Telford house supplied by Messrs. Braithwaite & Co. (Engineers), Ltd., West Bromwich; and the accompanying illustrations, which are reproduced by the courtesy of the City of Birmingham Gas Department, whose apparatus is installed in the house concerned, are of the interior of a typical "non-parlour" design, decorated, furnished, and equipped ready for occupation.

It will doubtless be remembered that the chief features of the Telford all-steel houses are the employment of hollow steel walls, semi-box form in section, which are self-supporting and need no stanchions, painted externally with an elastic rubber paint and finished inside with a preservative composition; the inner lining being a light timber framing that carries a thick felt layer next to the cavity and is filled in with asbestos or similar sheeting to form the interior surface of the walls. Another valuable and unique characteristic is the circulation of warm air within the hollow walls, kept at a constant temperature by contact with the sides of the steel vertical box through which are led the cast-iron flues from the fires in the various rooms.

Within, the Telford houses are roomy and homely; the accommodation comprising a living room, 14 ft. 4 in. by 14 ft. 2 in., and containing a bay window, scullery 10 ft. 8 in. by 8 ft. 6 in., a good bathroom, pantry, coal cellar, and W.C., and on the first floor three bedrooms measuring 14 ft. 2 in. by 10 ft. 8 in., 14 ft. 2 in. by 8 ft. 8 in., and 10 ft. 8 in. by 8 ft. 10 in. respectively—the two larger being provided with coal fires across the corners.

From the photograph reproduced in fig. 1 it will be seen that the living-room is provided with an open fire with high-pressure boiler at the back, in place of the usual range; cooking being carried out on the gas stove situated in the scullery, which is illustrated in fig. 2. This picture also shows the gas copper, the deep sink with hot and cold water supply, and a corner of the bathroom. One of the principal bedrooms is shown in fig. 3; and in this instance a gas fire is fitted instead of a coal grate.

Pleasant in external appearance and bright within, the Telford all-steel houses are at once durable, warm, quickly erected, hygienic, and vermin-proof. They are cheaper than either brick built or concrete houses both in first cost and in maintenance, are permanently weather-proof, and fulfil all the requirements of the type of home now most in demand.

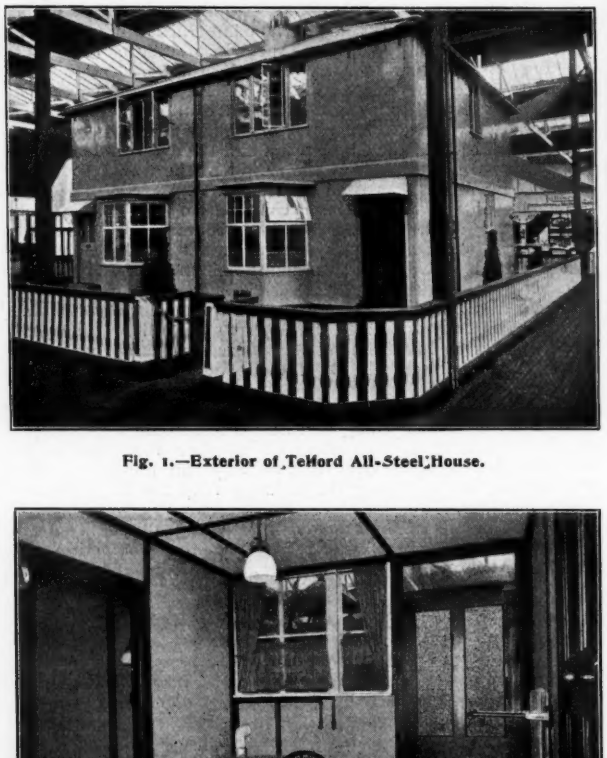


Fig. 1.—Exterior of Telford All-Steel House.

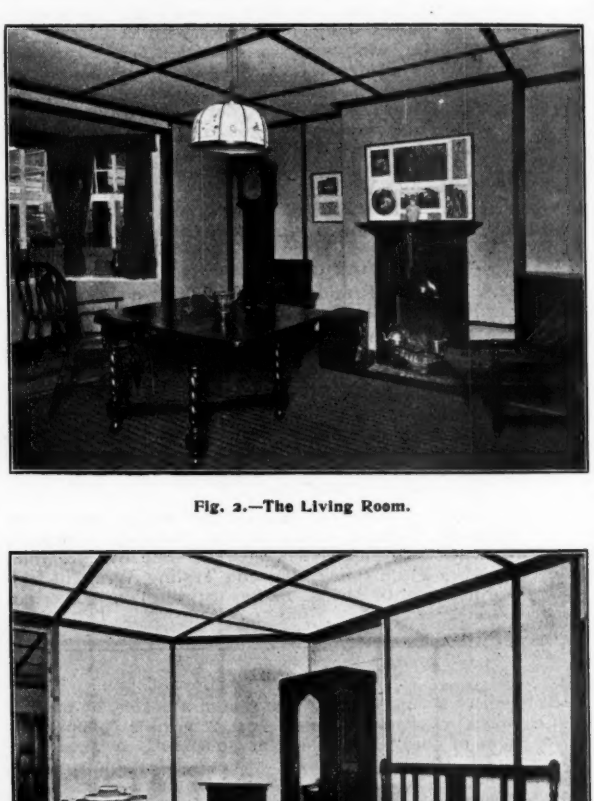


Fig. 2.—The Living Room.

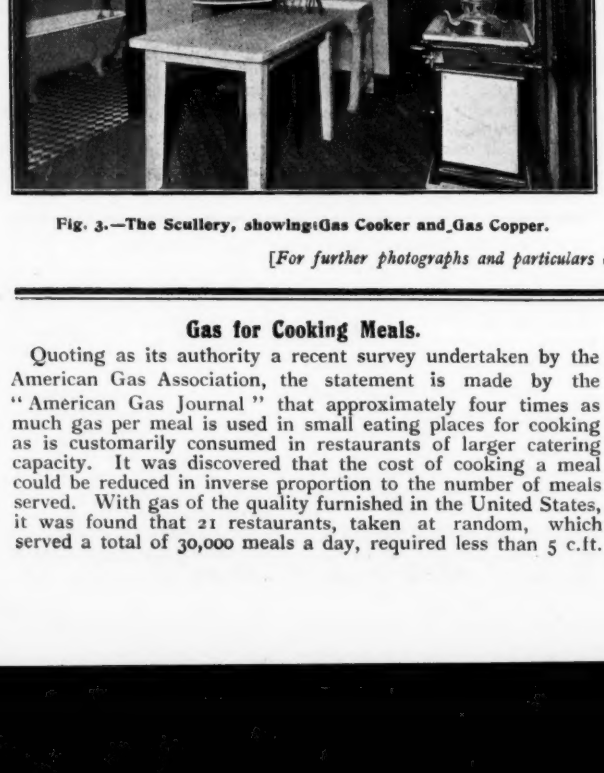


Fig. 3.—The Scullery, showing Gas Cooker and Gas Copper.

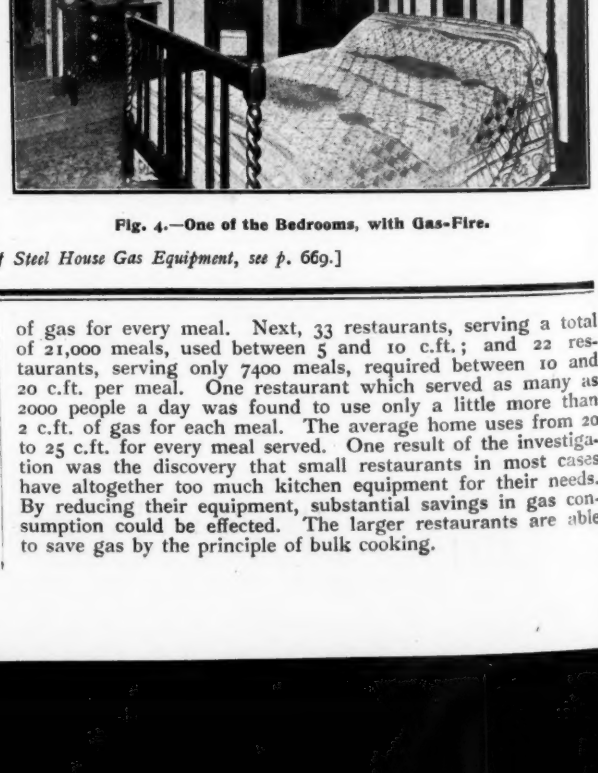


Fig. 4.—One of the Bedrooms, with Gas-Fire.

[*For further photographs and particulars of Steel House Gas Equipment, see p.* 669.]

Gas for Cooking Meals.

Quoting as its authority a recent survey undertaken by the American Gas Association, the statement is made by the "American Gas Journal" that approximately four times as much gas per meal is used in small eating places for cooking as is customarily consumed in restaurants of larger catering capacity. It was discovered that the cost of cooking a meal could be reduced in inverse proportion to the number of meals served. With gas of the quality furnished in the United States, it was found that 21 restaurants, taken at random, which served a total of 30,000 meals a day, required less than 5 c.ft. of gas for every meal. Next, 33 restaurants, serving a total of 21,000 meals, used between 5 and 10 c.ft.; and 22 restaurants, serving only 7400 meals, required between 10 and 20 c.ft. per meal. One restaurant which served as many as 2000 people a day was found to use only a little more than 2 c.ft. of gas for each meal. The average home uses from 20 to 25 c.ft. for every meal served. One result of the investigation was the discovery that small restaurants in most cases have altogether too much kitchen equipment for their needs. By reducing their equipment, substantial savings in gas consumption could be effected. The larger restaurants are able to save gas by the principle of bulk cooking.

LONDON'S SMOKE PROBLEM.

In a paper on this subject, which was read at a meeting of the St. James's Literary Society, in St. James's Hall, East Dulwich, on the 4th inst., Mr. E. W. L. NICOL (Fuel Expert to the London Coke Committee) said that the coal smoke problem in London, and the manner of its solution, were in many ways peculiar to London, having regard to the industries carried on, the relatively large area and population, and the high aggregate coal consumption. The coal smoke nuisance was traced from the time when coal was first introduced as fuel in London. The resentment of the inhabitants, at that time used to wood as fuel, and the steps taken to prohibit the use of coal, were noted. Even then, coal smoke was regarded as injurious to health.

London's yearly coal consumption, estimated at 18,000,000 tons—an average of nearly 50,000 tons per 24 hours throughout the year—was briefly analyzed as follows: Including all grades of industrial and steam coal, gas coal, and house coal, the annual cost at (say) 35s. a ton, is of the order of £35,000,000. But this figure makes no allowance for the cost of collecting and disposing of the ash and unburnt cinders, which would amount to at least 10 p.ct., or 1,800,000 tons a year. Nor does it allow for the removal from paintwork, stone buildings, &c., of the soot which, it has been estimated, descends every year upon the Metropolitan area to the amount of about 300 tons per square mile. Another item of cost attributable to the use of raw coal as fuel results from the traffic delay and other incidental losses due to smoke fog, which have been estimated to reach £1,000,000 per day during a dense fog. The house coal used for domestic and quasi-domestic purposes in London has been calculated at 6,000,000 to 8,000,000 tons a year.

Among the largest individual industrial coal consumers are the great sugar refineries on the Thames. The London County Council tramway power station at Greenwich, and the Chelsea power station of the Underground Railways, use, respectively, about 600 tons and 800 tons a day. Electric light and power stations in London and the Home Counties consumed, in 1923, 1,839,720 tons, according to the report of the Electricity Commissioners. The coal so used is completely destroyed. About 80 p.ct. of the heat value is lost; no bye-products being recovered in the conversion into power, heat, and electricity.

The greatest of all coal-using industries carried on in London is that of gas supply, which uses (but does not consume) over 4,600,000 tons of coal a year, in addition to some 17,000,000 gallons of solar oil—a distillate of petroleum employed for gas making. Rendered smokeless by the gas-works process of high-temperature carbonization, this is distributed to consumers in the form of gas and smokeless fuel (2¼ million tons); the coal actually consumed in the process of carbonization amounting to about 15 p.ct. In addition to being rendered absolutely smokeless, the commercial value of the coal carbonized at the gas-works is—largely by expenditure on labour—very materially increased, to the benefit of the workers, the consumers, and the proprietors.

The ratio of coal treated at gas-works and rendered smokeless to the total coal used in London exceeds 22 p.ct., whereas the ratio for the country as a whole is only about 9 p.ct.; so that the contribution of gas and coke towards the mitigation of the smoke nuisance in London is considerably more than double that of electricity, which absorbs less than 10 p.ct. of the total coal used. There is every reason to expect an early result from the diligent and energetic smoke abatement propaganda carried on by the gas industry; and the banishment of London's smoke cloud, which is renewed daily by the imperfect combustion of 50,000 tons of coal, is simply a matter of the more efficient use of coal by means of carbonization.

Mr. W. Doig Gibb, who occupied the chair at the meeting, gave, in reply to a question raised during the discussion of the paper, some interesting information upon recent progress in the distribution of gas.

Derby Gas Light and Coke Company.

The distribution and gas sales department of the Company held their annual dinner on Friday, Feb. 27. During the evening the Chairman (Mr. T. Loudon) presented Mr. Harry Clark (the Distribution Superintendent) with a barometer subscribed for by the employees. Acknowledging the gift, Mr. Clark paid a tribute to the loyalty of the distribution staff. The past year, he said, had been a record one for the Company, which was now 104 years old. It was an interesting fact that, during the whole of this long period, there had been no instance of the supply of gas having failed generally. Mr. Clark presented seven pensioners with pieces of aluminium painted gas tubing, each of which contained a half-sovereign in gold. Mr. R. Wibberley, who is now over 80 years of age, in thanking Mr. Clark, gave some reminiscences.

Blackpool Gas Finances.—Figures presented to the Blackpool Gas Committee show a 50 p.ct. advance; but the approximate net profit of £4500 is much below the usual return. Last year the profit was £20,322, of which £5000 went to the rates, £400 towards the cost of the second carnival, and £15,000 to reserve. The great factor has been the reduced prices obtainable for residual products. The estimated income for the current year was £187,298, and the approximate actual income is £179,520—a difference of £7778, due to the fact that residual products brought in £48,302, instead of an anticipated £55,120.

THE BANDED CONSTITUENTS OF COAL.

In the "JOURNAL" for June 6, 1923, p. 592, was published a brief account of work carried out by A. V. Hendrickson on the banded constituents of coal. The conclusion reached as the result of this work was that "while fusain, durain, clarain, and vitrain from the same coal may be distinct and show distinct variations in chemical and physical properties, this generalization does not indicate that similar banded constituents from other sources will show precisely the same characteristics." This conclusion was based on the results obtained from determinations of the evolution of heat on treatment of coal with nitric acid, of the increase in weight of the coals on evaporation with nitric acid, and of the contents of volatile matter as determined by the usual crucible test. The work has since been extended to a study of the analyses of the coals and of the gases evolved on distillation; and the results, which are given in the February issue of "Fuel in Science and Practice," confirm the statement that no precise characteristics can be attributed to any one of the ingredients of banded coal, irrespective of its source.

Samples of durain, clarain, and vitrain from a varied selection of coals were ground to pass a 30 and remain on a 60 (I.M.M.) sieve, and were subjected to distillation in a Lessing coking apparatus at 900° C. during 7 minutes. The resulting cokes and tar samples were weighed, and the gas was measured and analyzed. The coke and tar yields have been calculated on a dry ash-free basis. The averages of the results obtained are given in the following table.

Characteristics and Gas-Making Values—Summary.

—	Durain.	Clarain.	Vitrain.
Volatile matter, p.ct.	36·9	37·7	33·7
Fixed carbon, p.ct.	63·1	62·3	66·3
B.Th.U., per lb.	14,848	14,593	14,763
Carbon, p.ct.	80·10	80·30	81·72
Hydrogen, p.ct.	4·78	5·04	5·38
Oxygen, ,,	11·52	11·82	10·27
Nitrogen, ,,	1·42	1·56	1·56
Sulphur, ,,	1·17	1·28	1·06
Method (*a*): Increase in temperature	16·3	22·3	20·0
Method (*b*): Increase in weight, p.ct.	28·1	27·1	24·8
Gas analysis—			
$CO_2 + H_2S$, p.ct. by vol.	4·9	6·7	3·3
O_2 ,, ,,	—	—	—
C_nH_{2n} ,, ,,	4·7	3·9	2·6
CO ,, ,,	7·1	10·2	9·0
CH_4 ,, ,,	35·3	34·4	34·1
H_2 ,, ,,	44·8	42·2	48·8
N_2 ,, ,,	3·2	2·6	2·2
Calorific value (B.Th.U. per c.ft.)	629	580	588
Gas, c.ft. per ton	8,073	9,191	9,358
Gas, p.ct. by weight	18·6	19·4	17·7
Coke, cwt. per ton	12·6	12·2	13·2
Coke, p.ct. by weight	63·0	61·0	66·0
Tar, gallons per ton	35·1	36·5	30·3
Tar, p.ct. by weight	18·5	19·2	16·0
Gas, therms per ton	50·7	53·3	55·0
C : H ratio	16·96	15·93	15·19
Ratio F.C. : V.M.	1·71	1·66	1·97

Generally speaking, therefore, vitrain yields the most gas and the least tar, durain gives a low volume of gas of high calorific value, while clarain gives the most tar, and vitrain the most coke. There is no marked difference in the amounts of hydrogen and methane produced by the various constituents. The proportion of the volatile matter appearing as gas increases slightly but regularly in passing along the series durain, clarain, and vitrain. There is no relationship between the oxygen content of the coal and the oxides of carbon in the gas produced. While clarain and vitrain evolve more gas than durain, the rates of production are regular.

Imperial Continental Gas Association.

The Board of the Imperial Continental Gas Association will recommend, at the Association's annual ordinary general meeting to be held at the Cannon Street Hotel on May 13 next: "That, subject to the verification of the accounts by the Auditors, there be paid, on May 26, 1925, a final ordinary dividend for the year ended Dec. 31, 1924, less income-tax at 4s. 6d. in the pound, at the rate of 5 p.ct. (actual), making with the interim dividend of 5 p.ct. (actual) paid on Nov. 15, 1924, a dividend of 10 p.ct. for the year."

This dividend will be additional to the 5 p.ct. centenary bonus, less tax at 4s. 6d. in the pound, and the special distribution at 19¼ p.ct. (net) already announced, which will also be paid on May 26, 1925.

The capital stock transfer books of the Association will be closed from April 27 to May 10, both dates inclusive.

Cookery Demonstration in Dublin.—An excellent opportunity of seeing the great developments of modern cooking appliances has been provided by the Alliance and Dublin Consumers' Gas Company. From Monday to Friday week (inclusive) a series of exceptionally interesting demonstrations of modern cookery was given by Miss Sanderson, the well-known expert. The lectures were exceedingly well attended, and great interest was shown in the cookery, and in the appliances themselves. The gas apparatus was supplied by the Richmond Gas Stove and Meter Company, Limited, and Messrs. John Wright & Co. (Radiation, Ltd., Proprietors).

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Unsealed Dip-Pipes and a Simple Alarm.

SIR,—In a letter from Mr. Harold Copp, which was published in the "JOURNAL" for March 11, p. 614, the following statement is made and illustrated: "This chamber is connected with another of much smaller area, containing a float, so that a small variation in the water-level in the first chamber *is multiplied several times* in the float chamber."

I contend that the water-level in the unequal chambers will vary exactly as the pressures, and that their relative areas have no function, so that the motion of the float will not be multiplied.

Knowing the difficulty of the young engineer to unlearn anything he has imbibed in error, this impression should be corrected, though in this particular instance it does not mar the very ingenious apparatus described.

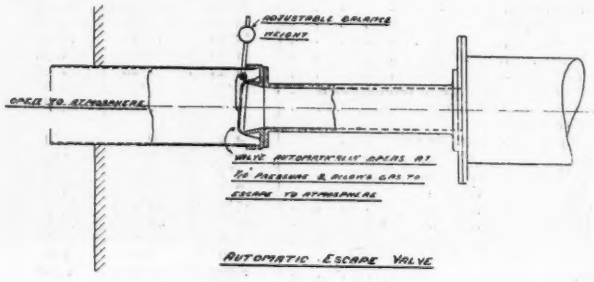
AD REM.

March 14, 1925.

Unsealed Dip-Pipes and a Simple Alarm.—Also an Auto-Pressure Release.

SIR,—The illustrated description on p. 614 of the "JOURNAL" dated March 11 shows a very neat safety device, which automatically gives an alarm, should from any cause the vacuum increase. However, in practice it is chiefly found that it is a block on the line that causes the gas being made to accumulate as a pressure. This pressure of gas can back into beds lying off, and also can burn at hydraulics, and at the top mouthpieces of verticals, to incommode the stokers, &c. Therefore it seems that to guard against a sudden pressure is more needed than to guard against a sudden pull.

In 1914, the Gas Engineer at Oldham, Mr. T. Duxbury, applied a delicately poised flap, whose normal position was closed; but at a pressure of 2-10ths it opened, and automatically by-passed the excess


ADJUSTABLE BALANCE WEIGHT
OPEN TO ATMOSPHERE
VALVE AUTOMATICALLY OPENS AT 2/10 PRESSURE & ALLOWS GAS TO ESCAPE TO ATMOSPHERE

AUTOMATIC ESCAPE VALVE

gas safely into the atmosphere. Thus it will be seen all mains are automatically nursed at a slight safe pressure; no gas escapes into the retort house to incommode the men; and when the block is removed and the exhauster restarted, the normal conditions restore themselves quite automatically. We have fitted this valve to quite a large number of installations with unfailing success.

An illustration is enclosed, and perhaps you will think the idea of sufficient general interest to publish same.

For Robert Dempster & Sons, Ltd.,
H. J. TOOGOOD.

Rose Mount Iron Works, Elland.
March 16, 1925.

The Institution Education Scheme.

SIR,—I am desired by the Board of Examiners under the Education Scheme of the Institution of Gas Engineers, with the approval of the Advisory Committee for that scheme, to send you the following observations of the Chairman of the Board of Examiners, and to invite the careful attention thereto of all students who are sitting in the forthcoming examinations.

"In reference to the forthcoming examinations in Gas Engineering, especially relating to the Diploma stage, the Examiners desire to call attention to the new syllabus (published in last week's issue of the 'JOURNAL,' see p. 620), wherein there is a wider application than heretofore. It is the desire of the Examiners to obtain from the Diploma candidates a knowledge of gas-works direction and practice in the wider sense—*i.e.*, the general direction with a view to efficient and economical working of the various units of manufacturing plants and bye-products utilization. The questions are fully developed under headings, but the object of this is to assist the student to realize clearly what the Examiners have in their minds, and not to call for long and weary explanations. Brevity and clearness of expression will be greatly appreciated. A note of warning may be sounded—namely, to the effect that the student should first carefully read through the questions, and realize the purport of each question; such time spent will, the Examiners feel, be amply repaid.

"Special direction may be called to the growing importance of waste-heat utilization from horizontal and vertical retort settings and C.W.G. plants, and the thermal problems and economies involved. Also the importance may be emphasized of the technical control of gas-making and residual plants, having special relation to the commercial aspects of such attention. Foundation work for modern plant construction, and the Government Acts affecting gas supply and manufacturing processes, should be studied.

"The Examiners desire to assist the student, and do not desire the examinations to be considered so much competitive as an opportunity for the candidate to present his knowledge of the technics and trend of the industry in the clearest and widest sense."

WALTER HOLE,
Organizing Secretary.

Dentdale, Barton, Torquay,
March 12, 1925.

Mr. Reber's Paper on Waste-Heat and Gas-Fired Boilers.

SIR,—With reference to my paper on "Waste-Heat and Gas-Fired Boilers," which appeared in your issue for March 4 (p. 529), I should like to make a few remarks in connection with fig. 2, showing the heat losses due to air infiltration. There is a possibility that the nature of the graph might be misunderstood.

This particular graph applies only to cases where, for a given CO_2 content, the temperature of the waste gases is identical with that shown on the graph. For example, if for a CO_2 content of 14 p.ct. there is a temperature of 1300° Fahr., the temperatures for CO_2 contents above and below 14 p.ct. correspond with those given by the graph.

It is, of course, quite obvious that waste gases with a CO_2 content of any percentage may have any temperature. In other words, the graph must be drawn out for each individual case, and has merely been included in the above paper to illustrate more effectively the detrimental effect of air infiltrations on the efficiency of waste-heat boiler recovery plants.

JAMES W. REBER.

52, Grosvenor Gardens, London, S.W. 1,
March 10, 1925.

Mr. E. W. L. Nicol's Paper on "Fuel Economy."

SIR,—From a paper read by Mr. E. W. L. Nicol before the Institution of Marine Engineers [see "JOURNAL" for March 11, p. 594]: "This system is stated to produce 8000 c.ft. of gas, 10 gallons of gasoline, 20 lbs. of ammonium sulphate, 30 gallons of crude light tar, 2 gallons of creosote oil, 2 gallons of crude lubricating oil, 10 lbs. of grease, and some heavy tar-like oil, the amount of which was not known, and its value not estimated, though it is known to be good for fuel, as well as three-quarters of a ton of coke." (I wonder how it adds up.)

If this is true, within 100 p.ct., then one must assume a coal to start with which "licks" all other coals in creation, and one which is not found this side of the Atlantic, and consequently has no immediate bearing on the economics of this country. But as the paper was evidently written for assisting people in this country, why not then quote correct figures, of which there are some available—for instance, the Fuel Research Board's? The mere random quoting of figures without comment does an infinite amount of harm generally, and to serious workers in particular. That coke breeze can be burnt with great success under boilers—for instance, by the "Sandwich" system, which, if I am rightly informed, was first initiated at one of the Yorkshire Electrical Power Company's stations—is of immense importance, and a subject important enough to stand by itself, without being diluted with vague statements as to what would happen if milliards of tons of coal were treated by any oversea wizard's plant.

HARALD NIELSEN.

March 12, 1925.

Employment of Ex-Service Men.

SIR,—The question of finding employment for ex-Service men is one of the gravest consequence. The fact that there are at the present time over three-quarters of a million of them workless and in sore distress is in itself a clear call for immediate action.

The British Legion, of which I am President, have always held the view that the finding of employment for the men who stood by the Empire during the Great War is of paramount importance, for the absorption of these men into industry means the automatic alleviation of distress. Much has been done by the Legion in this direction, in face of great difficulties due to protracted trade depression; but much more remains to be accomplished, and I most earnestly appeal to all employers in the London area to notify any vacancies as they occur to the Secretary, Employment Bureau, British Legion, Ashley Mansions, Vauxhall Bridge Road, S.W. 1. (Telephone, Victoria 5964); or, outside London, to the Secretary of the local British Legion Branch.

To do this will be to perform a patriotic duty, which will play its due part in the solution of the problem of placing in employment the men who have so great a claim to preferential consideration.

HAIG, F.-M.

26, *Eccleston Square, London, S.W.* 1,
March 11, 1925.

Glasgow and Coke Oven Gas.—A Sub-Committee have reported to the Gas Committee of the Glasgow Corporation as to a conference with Messrs. James Nimmo & Co., Ltd., relative to their proposals to sell to the Corporation bulk supplies of coke oven gas from the works to be established by them at their collieries at Auchengeich, near Chryston. After considering information obtained from certain towns in England where supplies of coke oven gas are being taken from colliery companies under agreement, the Committee recommended an agreement with the Company for 10 years for a supply of purified coke oven gas of not less than 1,000,000 c.ft. per twenty-four hours, the gas to be of a calorific value of not under 480 B.Th.U.; that the price to be paid by the Corporation for the gas be 11d. per 1000 c.ft. (at the option of the Corporation, this price may be reviewed at the end of five years, regard being had to the cost to the Corporation of manufacturing gas at their various works); that the Company provide at their works all necessary plant for purifying and measuring the gas; and that the Corporation lay the necessary mains to convey the gas to the Provan Gas-Works.

REGISTER OF PATENTS.

Gasholders.—No. 229,128.

BLAKELEY, W., of Church Fenton.

No. 7531; March 25, 1924.

According to this invention a flying lift or lifts for a holder is or are constructed on the spiral-guided principle, and used in conjunction with an ordinary column-guided holder. The patentee remarks that normally flying lifts, when fully inflated, receive no support or guidance from the columns; but by constructing them on the spiral-guided principle they are properly secured by the spiral rails and guide carriages.

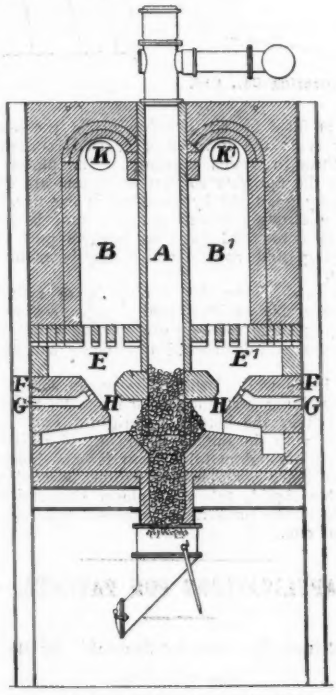
Distillation of Carbonaceous Substances. No. 227,879.

SUTCLIFFE, E. R., of Leigh, Lancs.

No. 19,121; July 25, 1923.

The invention relates to the distillation of coal and similar carbonaceous substances. Steam is decomposed for the production of combustible gas, which in part is used for heating the charge to be distilled and in part is utilized for heating one of a pair of heaters, regenerators, or blast stoves that are alternately used for superheating the steam before its admission to the charge.

In carrying the invention into effect, a number of vertical retorts A are provided in the same setting. These retorts are of oblong cross-sectional shape, with the major axes of the cross-sections in line; and the retorts may advantageously be of firebrick, and tapered outwardly towards the bottom.



Coal Distillation—E. R. Sutcliffe.

Operation is intermittent. Steam is admitted at K^1 into the heater B^1, passes downwardly, and is raised to a high temperature—for example, 850° C. It then passes through the combustion chamber E^1, through the space H into the charge accumulating beneath the lower end of the retort. The steam thus superheated passes through the accumulation of fuel beneath the retort A, and a combustible gas is produced by its decomposition in reaction. Part of this combustible gas passes up through the charge of fuel in the retort, imparting its sensible heat to the charge, and thus effecting its distillation, the vapour and gas passing outwardly through the gas off-take pipe, together with any residual steam that may not have been decomposed. Another part of the combustible gas produced passes out into the combustion chamber E, and in passing through the narrow space H is burnt with air passing in through the air holes G. Thus the flame and hot gases pass upwardly into the heater B. After a determined period (say, 30 minutes), the heater B will have been raised to a sufficiently high temperature, and the heater B^1 will have been cooled, whereupon the supply of steam may be cut off from B^1 and be admitted to B. The waste gas outlet of B is simultaneously closed, and that of B^1 opened, whereupon a complete reversal of the operation may be carried out for a further period.

No limitation is involved of the particular temperature conditions that may be used. Where, for example, it is desired to produce a maximum quantity of oils and tar from coal, the distillation may be carried out at a low temperature, such as 750° C., and an excess of steam used; whereas if a maximum gas production is desired, the distillation may be carried out to 1200° C., and such a quantity of steam admitted as can be readily decomposed. If a high yield of oils and tar and a high yield of gas are desired, the process may be carried out at a high temperature with excess of steam.

It will be understood that gas may be admitted with the steam, whereby the distillation may be carried out in the same manner as hereinbefore described; or combustible gas alone may be used, the gas being admitted alternately through the respective heaters, instead of steam.

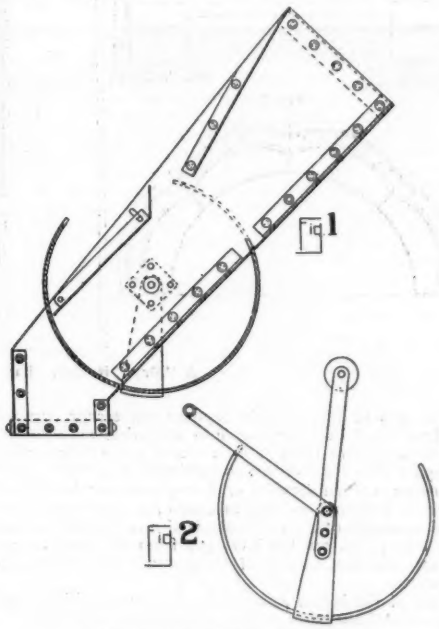
The process is applicable to briquetted coals.

Measuring and Delivering Coal.—No. 227,996.

DRAKES, LTD., and DRAKE, J. W., both of Halifax.

No. 898; Jan. 12, 1924.

This invention, for measuring coal and similar substances, relates to apparatus in connection with a shoot or hopper, and seeks to provide that the material is delivered in measured quantities with the greatest accuracy and without any being scattered or wasted by overflowing, &c.



Coal-Measuring Shoot—Drakes, Ltd.

Fig. 1 is a side sectional elevation of the arrangement, and fig. 2 is a side elevation of the main feature. The latter consists of a part cylindrical shield mounted in the inclined hopper. The shield is provided with a handle and balance weights to facilitate its rotation for receiving and delivering a measured quantity of coal. The construction and working will be clearly understood from the drawings.

Slip Blanks.—No. 228,404.

GLASGOW, A. G., of Victoria Street, S.W. 1.

No. 11,849; May 13, 1924.

In water gas plant provided with waste-heat boilers it is common practice to provide gaps in the hot gas connections into which can be inserted gate valves or "slip blanks" for shutting off the hot gases from any particular part of the plant; the blanks being replaced by slip rings which complete the continuity of the connections in normal working. Such slip blanks, if made of cast iron, are, says the patentee, liable to crack and allow gas to pass, or, if in the form of wrought-iron plates, to become so warped that there is great difficulty in withdrawing them from the gaps.

According to the invention, the valves or blanks are built up of centres of metal plate and asbestos or like protective material, and marginal metal rings of greater width in cross section than the centres.

The specification describes and illustrates details in the construction.

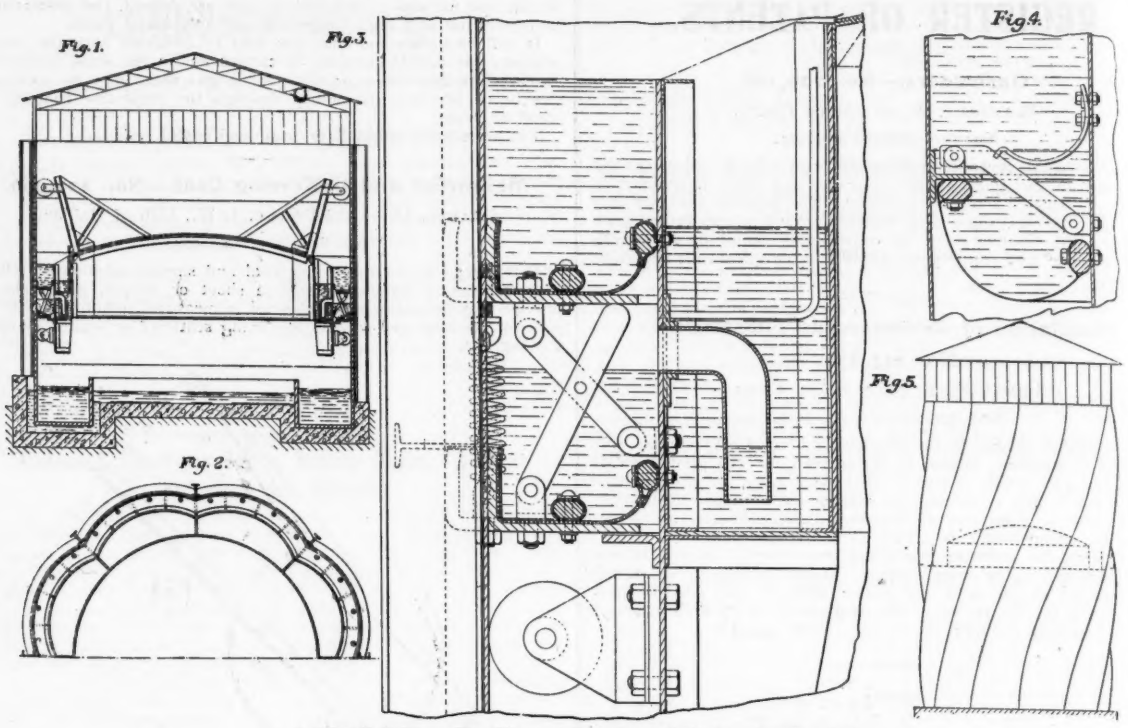
Tankless Gasholders.—No. 228,986.

SMITH-REWSE, H. S., of Cannon Street, E.C. 4, NIELSEN, H., of Muswell Hill, N. 10, and THE WHESSOE FOUNDRY AND ENGINEERING CO., LTD., of Darlington.

No. 28,526; Nov. 12, 1923.

This invention relates to a design of tankless or "dry" gasholder; and in introducing the specification the patentees recall that great difficulties have been experienced in assuring complete gas and vapour tightness consistent with a free and easy movement of the floating piston device or dome. They also affirm that "serious accidents have occurred, owing partly to uneven working and consequent adherence to the sides, and partly to the fracture of the flexible medium, so that the liquid tar or oil seal has broken down and a large escape of gas or inflammable vapour has taken place."

The present design provides one or more additional or superimposed liquid safety seals, so that if the first or bottom seal is



A "Dry" Holder.—The Wheatsoe Foundry and Engineering Co., Ltd.

ruptured, no gas or inflammable vapours can escape, the additional safety seal or seals then coming into operation automatically. In a suitable arrangement there is an annular space between each seal, in which space either air or a non-combustible or inert gas—for instance, nitrogen, carbon dioxide, or flue gases—can be maintained at any convenient pressure, so that in case of leakage past the first or bottom seal no escape of a gas or vapour of a combustible or poisonous nature can take place, but the inert gas from the annular space only can penetrate into the interior of the container or holder owing to higher pressure.

The design of the holder covered by the patent will be understood from the general description read in conjunction with: Fig. 1, a vertical section; fig. 2, a half horizontal section; fig. 3, a vertical section of a portion of fig. 1 to a larger scale; fig. 4, a vertical section of a modification; and fig. 5, a diagrammatic elevation showing the invention applied to a holder in which the piston works up and down in special guides.

The sides of the holder may be formed of any convenient number of rounded sections of a radius shorter than that of the circle of the movable piston or dome if the latter were made cylindrical. Each seal is formed of a sliding angle-bar or T-bar, either in one piece or a series of pieces joined together for each section, and the bar or bars of each seal is or are joined by means of flexible material, such as multiple canvas reinforced by flexible metal gauze and wooden strips, to the sides of the movable dome, thus forming a flexible receptacle for the sealing liquid or substance. The angle or T bars of each seal may be joined together by means of crossed links, for example, whereby a flexible parallel motion of the bars, with relation to the internal tank surface, is maintained, and in case of accidental tilting of the dome from the horizontal no escape of gas can take place. A series of adjustable bolts with springs connects the angle-bars of each seal at intervals, and is preferably situated between the aforesaid links, of which any desired number may be employed for each angle-bar or section. By compressing the springs by means of nuts on the bolts, the links are actuated and cause the angle-bars to press against the sides of the container, such pressure being varied by adjusting the springs. Furthermore, the links connecting the angle-bars are so fixed to the sides of the floating piston or dome that they serve as a support for the sealing liquid.

Another method of supporting the angle or T bars carrying the flexible canvas seal is to suspend them from the top part of a free-swinging bracket-like member in such a manner that the combined weight of the seal and spring pressure tend to pull the bracket member downwards and decrease the angle it makes with the horizontal, whereby a resilient adjustable pressure will be maintained between the angle or T bars and the wall of the holder or container. [See fig. 4.]

The annular space between the superimposed seals may be occupied by an inert gas, as previously stated, which by any suitable means is maintained at a pressure somewhat higher than that of the gas in the holder. Thus, if any leakage occurs, the higher-pressure gas will penetrate into the lower-pressure gas, so that no escape of inflammable gases to the outside of the holder can take place. Liquid pressure gauges may be arranged so that the difference in pressure between the gases can be ascertained and allow of keeping the system under absolute control, as an equalizing of the pressure in any seal section would indicate a leakage of tar, gas, or vapour.

The floating piston or dome may be spirally guided on the uprights, the spiral portions of the latter fitting the sections of the float; such construction preventing any tilting of the latter from the horizontal.

An annular container for the tar or other sealing substance may be provided between the seals and the vertical side of the piston. This container is filled by the overflowing of the sealing substance from the upper seal; the lower seal or seals communicating with the container through sealed openings. The plates of the holder may be fixed to the uprights so that all seams are free and can be rendered absolutely gas-tight by caulking in the usual way.

Furthermore, a strongly braced structure may be arranged in the floating piston or dome and form an integral part thereof, for the purpose of carrying guide-rollers, which may be mounted on suitable spring carriages.

The container and piston device may be of cylindrical form in plan, but are preferably as illustrated in fig. 2—a series of arc-like sections. In fig. 5 these sections are spirally arranged so that the piston in its upward and downward movements will also turn around its axis.

In fig. 1 the inner wall of the drain cup is shown forming with the foundation an inner receptacle which can be filled with any desired liquid to render the bottom gas-tight. This inner receptacle may communicate with the outside by means of a U-shaped channel. Thus an expensive riveted metal bottom for the holder is dispensed with, and the ordinary concrete foundation, covered with water or any other suitable liquid, takes its place. No claim to this construction is made in the present application, as it forms the subject of an independent one.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for March 11.]

Nos. 5603-6319.

Aldridge, J. G. W.—"Apparatus for manufacture of coal gas." No. 5806.
Ashley, T. J.—See Aldridge, J. G. W. No. 5806.
Carr, W. M.—See Aldridge, J. G. W. No. 5806.
Damiens, A. A. L. J.—"Extraction of carbon monoxide from gases." No. 5698.
Evered & Co., Ltd.—"Means for operating gas valves from a distance." No. 6011.
Gee, A.—See Evered & Co., Ltd. No. 6011.
Helps, G.—"Gas cookers, &c." No. 5606.
Parker, C. H.—"Retorts for distillation of coal, &c." No. 6194.
Pryor, E. L.—"Geysers, &c." No. 5931.
Wilson, W. A.—"Gas taps." No. 6117.

Gas Exhibition at Formby.—A successful exhibition of labour-saving appliances and special cookery demonstrations concluded at Formby, near Liverpool, last Friday night. It was organized by the Formby Gas Company, and was opened by Mr. J. S. Rimmer (the Chairman). Others present included Mr. Harold Martin, Mr. Joseph Rimmer, Mr. Samuel Glover (Consulting Engineer to the Company), and the Manager (Mr. Fred H. Buckley). Mr. Rimmer, in his opening speech, said the therm was a vigorous sort of thing. It was sound, for it secured that the customers obtained what they wanted for the work they had to do, and paid only for what they had. Having established this, the Gas Engineer called in the resources of science and commerce to see that the good quality of gas which he was producing was supplied to the consumer through appliances constructed on the best principles.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Gas Regulation Act.

The draft Special Orders proposed to be made by the Board of Trade under section 10 of the Act, on the applications of the Scunthorpe and Frodingham Urban District Council and the Teignmouth Urban District Council, were approved on the motion of Viscount Peel.

A copy was presented of a draft Special Order relating to the Welwyn, Knebworth, and District Gas Company, Ltd.

HOUSE OF COMMONS.

Synthetic Nitrogen Products.

Mr. JOHN BECKET asked the Minister of Agriculture (1) what fertilizers were connected with fixated nitrogen, and the agricultural value of these products; (2) the prices at which fertilizers connected with fixated nitrogen were sold; and what factories were producing them; (3) the monthly output of factories supplying fertilizers connected with fixated nitrogen; and whether the Government had any interest or control in any of these factories.

Mr. WOOD, in reply, stated that the better-known fertilizers derived from atmospheric nitrogen were synthetic sulphate of ammonia, cyanamide, and nitrate of lime. All of these were of recognized value for agricultural purposes. The only plant turning out synthetic nitrogen products on a commercial scale, so far as he knew, was that of Synthetic Ammonia and Nitrates, Ltd., at Billingham-on-Tees, the output of which was in the neighbourhood of 120 tons a day. The Government had no interest in, or control of, the production of fertilizers by this undertaking. Neutral sulphate of ammonia (21·1 p.ct. nitrogen), which is the quality produced by this factory, is being sold at present in 4-ton lots delivered to the farmer's station at 14 guineas per ton.

Mr. BECKET: Can the Rt. Hon. Gentleman give any idea of the amount of sulphate of ammonia produced from other sources?

Mr. WOOD: I will do my best to give the information, if another question is put down.

MISCELLANEOUS NEWS.

LEA BRIDGE DISTRICT GAS COMPANY.

The Annual General Meeting of the Company was held at the Offices, Nos. 63 and 64, Chancery Lane, W.C., on Tuesday, March 10—Mr. A. M. PADDON presiding.

The SECRETARY (Mr. Henry Hand) read the notice convening the meeting; and the report of the Directors and the statement of accounts were taken as read.

THE LATE MR. A. F. PHILLIPS.

The CHAIRMAN, on rising to move the adoption of the report and accounts, remarked that since the last general meeting of the Company they had had the great misfortune to be deprived of the services of their esteemed colleague Mr. Arthur Frederick Phillips. At a date so far removed from the time of his death, he did not propose to speak to the proprietors at any length of Mr. Phillips; but he felt he must emphasize what was indicated in the report—that the Company had sustained a very heavy loss by his decease. They were all aware of his great knowledge and ability, of his amiable temperament and assiduity, and of the thoroughness with which he did everything that he undertook. To replace him, the Directors had appointed Mr. Ernest Lionel Burton, who was known to them as having the widest experience of gas administration, and as possessing very special expert knowledge as a gas accountant. Both these qualities were becoming of greater value as time went on in the practical administration of an undertaking such as theirs. Mr. Burton's appointment as a Director created a vacancy in the Auditorship; and the Board had temporarily appointed Mr. Hyde Clarke Burton to deal with the accounts, so that they might be presented to the proprietors in due form. This question of accountancy did not in these days stand on quite the same footing as it used to do. Gas accounts had become a particular form of study, and what might be called the cosmopolitan knowledge of the accountant did not meet the case at all. Mr. Hyde Burton had had the requisite special experience in connection with the accounts of other gas companies.

IMPORTANT INCREASE IN GAS SALES.

The sale of gas during the year 1924, as would be seen from the report, showed the very important increase for their Company of 11·7 p.ct. over that of 1923, and this was to a certain extent due to a change in calorific value. But this Company maintained a very steady rate of increase. They did not experience the abnormal and spasmodic increases to which some other gas undertakings were accustomed, but had always succeeded in preserving a healthy and continuous percentage of enlargement, right away through the past twenty or more years. This had now brought them to the dimensions of a very considerable undertaking; for their output had reached practically 1000 million c.ft. per annum. Throughout the twelve months under review they had been selling gas at 9½d. per therm; and having regard to all the circumstances, he looked upon this as a low price. If they would institute comparisons with other Metropolitan and Suburban Gas Companies of vastly greater size than their own, they would see how much the comparison was in favour of their undertaking. They differed from many other gas companies in the fact that the figures did not disclose any necessity for an increase in the price of gas, and no such increase was contemplated by the Directors.

THE CAPITAL POSITION.

Turning to the capital account, the most salient item, of course, was the "Balance carried to general balance-sheet, £49,436." This showed that they had very largely over-spent their capital account. The total amount that they had received came to a little over £390,000, which was equal to £466 per million c.ft. of gas sold; but what they had spent was the larger aggregate of practically £440,000, which gave a figure of somewhere about £489 per million c.ft., when there was deducted the amount arbitrarily added on conversion, which they had never actually handled as cash. These figures would tell them that the capital had been kept extremely low, having regard to the facts that the works were in a very high state of efficiency, and that the storage had been recently added to so as to give something like twenty-four hours, instead of the eight hours, which was a too precariously low margin to continue. The capital expended during the past year had amounted to £11,766; but as £8404 had been written off, the relation between their capital and their business had been very materially improved.

FIGURES IN THE REVENUE ACCOUNT.

On the credit side of the revenue account, in spite of the considerable reductions in price from 11d., 10½d., and 10d. to 9½d. per therm, over the whole period, receipts from gas and rental of meters, stoves, and fittings, had increased by £5863, and residual products had provided them with considerably over £1000 more. Altogether on the credit side they were £7250 to the good; but on turning to the debit side, the composite entry of coal, oil, and coke nearly wiped this out, with an increased cost of £7140. After this point, the various items became a series of "gives and takes," without any material effect one way or the other. Maintenance charges had been kept to over 18d. per 1000 c.ft.; and rates and taxes included an amount of some £650 which had been added in intelligent anticipation of a trouble that was coming upon them, and which they might be sure would not be evaded. A sum of £1200 had been carried to the special purposes fund, and coming to the end of the revenue account, the expenditure had gone up by some £8500. As the receipts were more by £7250, the profit was curtailed to the extent of £1280. When, however, the £29,802 was carried over to the profit and loss account, they found it ample for all that was required of it, because, whereas £17,041 was brought into this account, they were taking forward £17,085. Therefore they would be just a little better off after paying the dividend and meeting normal interest charges. The reserve and special purposes funds were of very respectable dimensions; while the benefit fund had an accretion from the revenue account of £1666.

CO-PARTNERSHIP.

If they took this £1666 in connection with the co-partnership fund item in the revenue account, it would be seen that the two represented something like £4000 appropriated from the accounts for the benefit of the employees. It would no doubt interest the proprietors to know how this co-partnership movement had succeeded with their Company. Well, he could assure them it was accomplishing with them much the same as in other cases, under the skilled direction and influence of their able Engineer and General Manager (Mr. F. W. Cross). There was no man with a longer experience than Mr. Cross of what might be termed industrial circumstances, and there was no man better able to put his experience to the best possible account. The relations between the Company and their employees had been immeasurably better since co-partnership was brought into operation. It might well be that there was yet something more to be accomplished, but the Board had derived the highest degree of encouragement from what had already been achieved. An East End area like theirs was not easy to work in. It was "cheek by jowl" with a good deal of industrial disturbance and political influence; and this being so, it was particularly gratifying that they should be able to maintain these improved relations with their employees. No one, he thought, could have expected more of them than they had succeeded in accomplishing during the comparatively short period that had elapsed since the introduction of the system; and when the time came round for him to report again on the matter to the proprietors, he felt confident of having a still further improved condition of affairs to deal with.

FURTHER ISSUE OF CAPITAL FORESHADOWED.

The general balance-sheet showed the debit on capital account to which he had already made allusion. This was important, because it was the inevitable prelude to an issue of capital, and of course it was the corollary and consequence of the development in their business which he had detailed. When the Directors did make this appeal for further capital, he hoped the proprietors would energetically respond, as much in their own individual interest as in that of the Company. Investments stood at about £35,000, and a note at the bottom of the balance-sheet told them that the value at Dec. 31 was £39,000, which was very satisfactory. Really, he did not think there was anything at all to apologize for in the accounts. With regard to the future, the development of their business was going on steadily. They were one of the comparatively few Metropolitan Companies who could point to a respectable increase from Jan. 1 to the present date. Coal had cost them slightly less than the year before, and they had now succeeded in purchasing for some twelve months ahead at a somewhat further improved rate. Whether it had been by luck or judgment, he would not say; but, at any rate, the Board were glad that they moved at the right time to secure this improved price. He wished he could give as good news with regard to oil; but oil had always been a rather disconcerting element in connection with their supplies of raw material. In respect to coal, although he thought the gas industry took only about 8½ p.ct. of the total output of Great Britain, the coal industry had always recognized the gas business as an integral portion of its system of supply, and gas undertakings had always been treated as worthy of regard. On the other hand, he did not think the gas industry had

ever succeeded in establishing itself very high in the estimation of the oil suppliers. They had to buy as and when they could, and had never had the same sense of security as in the case of coal. Since the war oil had been of very little assistance to the gas industry; for prices had been insisted upon which generally made the oil therm more costly than the coal therm—though he had no wish to speak dogmatically on the matter. It was his hope that in course of time an improved order of things might come about, and that the oil suppliers might realize that the gas industry was worthy of a little better treatment than the somewhat haphazard policy to which it had been subjected in the past. Residuals probably would decline in value, but not, he thought, to an extent which would seriously prejudice the Company. Looking at the matter all round, and bearing in mind particularly the increasing popularity of gas and the vast improvement in the apparatus used in connection with it—the proprietors might rest assured that the future of the undertaking was every bit as sound and as promising as anything that lay behind it.

The DEPUTY-CHAIRMAN (Mr. G. W. Carey) seconded the resolution, which was unanimously carried without discussion.

DIVIDEND, RE-ELECTIONS, AND THANKS.

On the proposition of the CHAIRMAN, seconded by Mr. J. M. MILES, dividends were declared at the rates of 5 p.ct. per annum on the preference stock and 6½ p.ct. per annum on the consolidated ordinary stock, both less income-tax.

The CHAIRMAN, proposing the re-election as a Director of Mr. G. W. Carey, said he had been on the Board a great many years, and was conversant with the policy and finances of the Company to an extent that not many Directors enjoyed.

Mr. E. L. BURTON seconded the proposition, which was unanimously agreed to.

Thereafter Mr. R. E. Gisburne (the retiring Auditor) was re-elected, and the appointment of Mr. H. C. Burton in a similar capacity was confirmed.

The CHAIRMAN proposed a very hearty vote of thanks to the officers—a vote which he remarked was thoroughly well deserved. The accounts were extremely good; and they were due in substance to Mr. Cross, and in form to Mr. Hand. Mr. Cross had been with the Company some thirty years, and had always done most excellent work for them. He had never had an easy appointment; for the Company was not an easy one to administer. The business had all along presented, in various directions, exceptional difficulties; but these had never for a single moment daunted Mr. Cross, whose working results would bear comparison with those of any engineer in the country. Mr. Hand became Secretary only twelve months ago; but the Board had known him a long time before that, and had formed a very high opinion of his abilities.

Mr. R. E. GISBURNE seconded the vote, which was cordially passed.

Mr. CROSS, returning thanks, pointed out that such results as had been achieved were only rendered possible by the loyal aid of the staff and employees generally. They had a very good combination, and all worked together for the good of the undertaking. Certainly this district was a peculiar one. The quantity of gas taken by the prepayment consumers was almost exactly the same as that taken by the ordinary consumers, so that it was a difficult area to work so far as distribution was concerned. There were also difficulties from the manufacturing point of view, but they had been successfully overcome. He would like to say that he had on the previous day seen his old colleague Mr. Richard Sandell, who was unhappily too ill to get about.

Mr. HAND also acknowledged the vote of thanks.

On the suggestion of Mr. F. W. CHURCH, it was decided to send to Mr. Sandell a letter of sympathy with him in his illness.

Dr. HAROLD G. COLMAN next proposed a vote of thanks to the Chairman and Directors for their careful attention to the Company's interests during the past year. In these days what investors were anxious to obtain was stability, and the figures of their Company for some years past had been as near stability as those of any gas undertaking in the kingdom.

Mr. CLIFFORD HUNT seconded the vote, which was accorded with unanimity, and acknowledged suitably by the CHAIRMAN.

Capital Issue by the Colonial Gas Association.—The abridged prospectus is advertised on another page of this number of the "JOURNAL" of an issue at par of 63,647 £1 8 p.ct. preference shares of the Colonial Gas Association, Ltd.—20,000 of which shares are reserved for allotment in London. The Association are well known to readers as having supplied with gas for many years past a number of towns in Australia. At present they own seventeen gas-undertakings in the Commonwealth, and both gas sales and net profits, it will be seen, are showing steady expansion. It is the provision of plant to cope with the rapid growth of the business that necessitates the raising of this further capital. Prospectuses and forms of application are obtainable at the London Offices of the Association, No. 17, Victoria Street, Westminster, S.W.

South Metropolitan Gas Company's Increased Price.—In connection with an increase in the price of gas, the South Metropolitan Gas Company have issued the following statement: Since midsummer, 1922, when the price of gas stood at 11½d. per therm, successive reductions have been made, the last occurring at Michaelmas, 1923, when the low price of 8d. per therm was reached. The Directors have used every endeavour to maintain the price at this figure; but in consequence mainly of the heavy fall in the receipts from bye-products, and partly owing to the increase in wages paid from the beginning of the year, it has been found necessary to increase the price to 8¾d. per therm in order to provide that revenue shall balance expenditure. The increased price will take effect from the date of reading the meters for the Lady Day quarter, and consumers may rest assured that the Directors will again reduce the price immediately circumstances will permit.

SHEFFIELD GAS COMPANY.

The 125th Ordinary Meeting of the Company was held on March 9—Colonel H. K. STEPHENSON, D.S.O. (Chairman), presiding.

The CHAIRMAN, in moving the adoption of the report and balance-sheet, said that after providing for dividends there remained a sum of £354 to be added to the amount previously carried forward. It was a matter of congratulation that there had been a healthy expansion in the demand for gas. They had sold 226 million c.ft. more than in 1923—an increase of over 5 p.ct. The year had again been marked by a decrease in the price of gas, which had been reduced from 7⅝d. per therm to 7d. (equal to 2s. 11d. per 1000 c.ft.); while large users were now paying 4d. per therm. These decreases had been made in spite of the fact that they were paying 100 p.ct. more for coal than they did in pre-war days. During the past year the Company had acquired the undertakings of the Dronfield and Woodhouse Gas Companies. Immediately the undertakings became vested in the Company, steps were taken to supply Dronfield with gas from Sheffield, and also to connect-up a supply of coke-oven gas to the Handsworth-Woodhouse undertaking. This had involved the laying of 5 miles of steel main of 8 in. and 6 in. diameter from Dronfield to Sheffield, and 1¾ miles of 6-in. steel main from Handsworth to the Woodhouse Works. Consumers in the added areas were very well satisfied with the change. The Company proposed to open-up showrooms both in Dronfield and Woodhouse. During the year under review, about 11¼ miles of main had been laid, to keep pace with new property. Sales of fittings had shown a large increase. There was a steadily growing demand for "all-gas" kitchens. As an illuminant, gas was not only holding its own, but was gaining ground; and for cooking and heating purposes electricity could not touch it. They had sold during the year 22,560,000 therms at a revenue of £591,000. Had this amount of heat been sold as electricity, it would have cost 3¾ million pounds, based on the average charge of 1·261d. per unit in Sheffield. Sales of domestic appliances created a record. The number of fires sold was 2833, wash-boilers, &c., 2662, and cookers 2023. Eighteen large bakers' ovens had been sold. It had always been the policy of the Company to give every possible assistance to manufacturers; and they had appointed a technical expert. During the year they had supplied 35 new furnaces consuming approximately 14,000 c.ft. of gas per hour. Their late Secretary, Mr. Hamby, retired at the end of the year, after devoting 43 years' service to the Company; and Mr. Halkett had been appointed in his place. Mr. Halkett now occupied the dual post which Mr. Hanbury Thomas had filled in former days. He expressed on behalf of his colleagues their warm appreciation of the good work of Mr. Halkett and the staff.

The DEPUTY-CHAIRMAN (Mr. B. G. Wood) seconded; and the motion was carried.

The CHAIRMAN moved, and Mr. R. LEADER seconded, "That a dividend for the half-year of £2 17s. 6d. p.ct. be declared on stocks 'A,' 'B,' and 'C.'"

This was carried.

LEICESTER GAS UNDERTAKING.

Allocation of Profits.

Considerable discussion on the annual report of the Gas Committee arose at the last meeting of the Leicester City Council as to the allocation of profits of the gas undertaking for the past year; there being an available balance of £10,166, which the Committee recommended should be placed to the reserve fund.

Mr. G. E. HILTON (Chairman of the Committee) said that the total receipts from gas were down by £49,000; this being due to the decrease in price, for they experienced the largest increase in output in the history of the undertaking—namely, 155 million c.ft. The total revenue was £592,808, a decrease of £62,000 compared with the previous year. The expenditure was £477,150, a decrease of £40,750. The balance carried to profit and loss account was £115,659, compared with £137,086 in the previous year. There was a balance available of £10,166, and the Committee proposed to carry this amount to the reserve fund.

Mr. J. P. BIGGS (Chairman of the Finance Committee) said that the Gas Committee had already more than £80,000 in their reserve fund; and, therefore, the comparatively small sum by which they now proposed to supplement it was not a serious addition. He moved that so much of the report as related to the allocation of the available balance be referred back to the Gas Committee, who should be asked to confer with the Finance Committee for the purpose of seeing if part of the amount could not be applied to the relief of the rates.

Alderman J. THOMAS seconded the amendment.

Mr. H. CARVER expressed a hope that the Council would support the recommendation of the Gas Committee. He had always contended that when a municipal trading concern was fully established, had a satisfactory reserve fund, and made a profit, some share of the balance should be used in relief of rates. But the circumstances to-day were very different from this. The Gas Committee, since it was established, had contributed £900,000 to the relief of rates. There were periods, however, at which it was not desirable further to deplete the funds. The £10,166 was the profit made upon a working capital of £1,606,000—representing ⅔ p.ct..

Mr. A. NAVIN supported the amendment.

The amendment was rejected by 26 votes to 14, the Committee's report being afterwards adopted.

Mr. HILTON proposed that the price of gas be increased for all purposes by 1d. per therm, or 4½d. per 1000 c.ft.

This was seconded by Mr. H. CARVER.

After discussion, the resolution was adopted.

The new gas offices and showrooms of the Buxton Corporation, which have been erected at a cost of nearly £3000, will be formally opened by the Mayor (Alderman Buckley) on April 8.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following further notices regarding applications to the Board of Trade under the Gas Regulation Act.

AMENDING ORDER.

Hornsey Gas Company.

The Company have applied to the Board of Trade for an Amending Order to substitute for the standard price of 16d. per therm one of 12d. per therm.

DECLARATIONS OF CALORIFIC POWER.

Gravesend and Milton Gas Light Company.—475 B.Th.U. (June 25.)
Highbridge Gas Company.—500 B.Th.U. (July 1.)

RAIDING THE GAS PROFITS.

An Old Policy Revived at Southport.

Faced with an increase in the estimates for 1925-26, the Southport Town Council, on the recommendation of the Finance Committee, have re-adopted the policy of raiding the profits of trading estates. The total amount required was £248,160—or an increase of £16,959 over 1924-25. The penny rate will produce £100 more than last year, and to make up the balance (so as to levy a similar rate to that of last year), it was decided to allocate £12,037 from the trading estates, as follows: Markets, £3577; and £2820 each from the gas, electricity, and tramways accounts. When the matter came before the Town Council on March 10, an amendment to reduce the estimates by £8460 was proposed and supported by, among others, the Chairman of the Gas Committee (Alderman Trounson); but the amendment was defeated by a large majority.

CARBONIZING PLANT AT MIDDLETON.

According to a report by the Chairman of the Gas Committee of the Middleton Town Council (Alderman A. Hilton), it has been decided to remove the hydraulically charged and discharged combination of vertical and horizontal retorts which were installed about two years ago. At the same time, he says he cannot speak too highly of the way in which the contractors (West's Gas Improvement Company, Ltd.) have met their obligations. They have lost a very heavy sum on the plant; but, taken on the whole, the Corporation have been at no loss themselves.

The firm have now arranged to take out this plant and to erect in its place a new vertical retort installation capable of producing 750,000 c.ft. of gas a day, and consisting of twelve retorts; the difference to be paid by the Corporation being roughly £8500. Alderman Hilton points out that this latter system is one which is in successful operation in no less than 1167 gas-works. He feels certain that the vertical retort is the right one for the Corporation. The 750,000 c.ft. daily capacity of the vertical installation compares with a 640,000 c.ft. a day guarantee for the plant that is to be superseded.

Underground Streets of London.

On Saturday last, March 14, about fifty foremen of the South Metropolitan Gas Company inspected the underground streets of the City of London. The visitors were met at the entrance of the subways in Farringdon Street by Mr. W. J. Liberty (Public Lighting Inspector of the City of London), who conducted the party and explained to them the history of this vast underground system. He remarked upon the ease with which mains of any size (there are in the various subways 24-in., 36-in., and 48-in. mains) could be laid and repaired, and pointed out that services could be laid without disturbing the carriage way or footpath. The supply to each house is numbered, and is fitted with a cock easy of access. After walking through about 1¼ miles of these underground streets, the visitors assembled for tea, after which Mr. F. A. Frost (Works Superintendent at the Old Kent Road Works), on behalf of the visitors, thanked Mr. Liberty and his Assistant, Mr. Kenward, for conducting them through the underground labyrinths. Mr. Liberty had made the afternoon doubly interesting by giving them an historic account of that part of London which they had visited. Mr. Liberty, in reply, said that, if he had been able to impart any information which would be useful to the visitors in their daily work, or if his remarks had served to inculcate the spirit of inquiry, he had been amply repaid.

Court of Inquiry regarding Steel Houses.—Lord Bradbury of Winsford, G.C.B., Mr. C. T. Cramp, and Mr. D. Milne Watson, LL.B., D.L., have been appointed by the Minister of Labour a Court of Inquiry to report upon the causes and circumstances of threatened disputes in connection with the erection of steel houses. The Court has been constituted under Part II. of the Industrial Courts Act, 1919. The inquiry will open to-day (March 18), at 10.30, at the Institution of Civil Engineers, Great George Street, S.W.

Plymouth Corporation Gas Undertaking.—Mr. J. Clifford Tozer (the Chairman of Plymouth Corporation Gas Committee) stated at last week's meeting of the Plymouth Town Council that it was the intention of the Committee that the price of gas should be reduced by 2d. per 1000 c.ft. During the past twelve months the undertaking had shown a profit of £5831, after payment of interest on the sinking fund, which amounted to over £12,000. The undertaking had had an excellent year, having produced 800,000,000 c.ft. of gas, which was the greatest in the history of the undertaking, and showed an increase of 65,000,000 c.ft. over the former maximum, which was in the previous year. It was not the intention of the Committee to make large profits.

GAS COMPANY RESULTS IN 1924.

Annfield Plain.

Presiding at the annual meeting of the Annfield Plain and District Gas Company, Mr. W. A. Scott said the accounts showed, for the first time for some years, an increase in revenue. There was a considerable drop in the receipts from tar, owing to the fall in price. On the other side, the expenditure was £23 more than in 1923. The gas sold was nearly a million c.ft. During the past two years the works had been brought into a thoroughly satisfactory state by Mr. Wilcock, the Engineer and Manager. He hoped now to be able to devote some attention to the distribution side of the business. The quantity of gas unaccounted for was abnormally high. The net profit for the year was £1952, against £1929 in the previous year, and the balance to the credit and profit and loss account was £141, which, he was sorry to say, was not sufficient to enable them to pay a dividend. Although it was not a satisfactory balance-sheet, the position, from the point of view of improvement at the works and in management, was more satisfactory than it appeared on paper, and he could only hope that the future had better things in store.

Barnstaple.

At the annual meeting of the Barnstaple Gas Company Mr. F. W. Hunt, J.P., presided. In their report, the Directors stated that the balance standing to the credit of the profit and loss (net revenue) account amounted to £5930. The increase in the sale of gas continued. The price from January, 1924, was reduced by 4d. per 1000 c.ft., and, calculated on the sale of the year, represented a gain to the consumers of £1057. The Chairman pointed out that the increase in the sale of gas had amounted to 3,007,900 c.ft., and in all departments there had been good progress. But though sales had increased, the revenue from gas was less by £1267, due to the reduction in price and to the increased discount to large consumers. Mr. Reavell remarked that it had become almost historic that the Company tried to hold the balance fairly between the shareholders and the public. A dividend was approved of 10 p.ct. per annum on the "A" shares and £7 7s. p.ct. on the "B" shares.

Bexhill.

The revenue accounts of the Bexhill Water and Gas Company for the half-year ended Dec. 31 show a total profit of £9079. Including the sum of £6982 brought forward, and after providing for fixed charges and placing £2000 to the contingencies fund, there remains the sum of £11,652 available for distribution. The Directors recommend that a dividend be declared for the half-year at the rate of 8 p.ct. per annum on the capital of £34,000 authorized by the Acts of 1885 and 1892; at the rate of £5 12s. p.ct. per annum on the capital of £123,720 authorized by the Act of 1896, Order of 1901, and Act of 1904; and at the rate of 5 p.ct. per annum on the preference share capital of £22,350—all less income-tax. This, with provision for income-tax, will leave £6269 to be carried forward.

Brixham.

A profit of £3313 on the gas account and £302 on the electricity account for the past year is shown in the annual report of the Brixham Gas Company. After carrying forward £334 to the renewals fund, the dividend on the original ordinary shares is to be at the rate of 11¼ p.ct., and on the additional ordinary shares 7⅞ p.ct. The price of gas is to be reduced from 1s. 2·2d. per therm to 1s. 1·8d. per therm, and electricity from 1s. 1d. to 1s. per unit.

Colchester.

In moving the adoption of the report and accounts at the half-yearly meeting of the Company, Mr. W. Gurney Benham (Chairman) said that, in view of the reduction in the price of gas, which now cost 10d. per therm, it was gratifying to know that the dividends had been fully earned. The decrease in price, had, as was hoped, stimulated the consumption. There had been an increase of 6 p.ct.—over 14 million c.ft.—in the quantity of gas consumed during the past half-year. Naturally the gross profit had been reduced; but it amounted to the substantial sum of £5880. Owing to increasing demands for gas, the Company were extending their carbonizing plant. The following dividends for the half-year were unanimously agreed to: £6 7s. 6d. on the "A" shares, and £4 9s. 3d. on the "B" shares.

Cromer.

In submitting the accounts for the year ended Dec. 31 last, the Directors of the Cromer Gas Company report that the 1924 "season" was unusually short, and as a result the Company's business was adversely affected; the sale of gas for the year (150,311 therms) being only 2 p.ct. more than that for the preceding year. After providing for interest, income-tax, and all other charges, there remains a balance of profit of £2380 available for division; and the Directors recommend the declaration of a dividend for the year of £5 2s. 6d. p.ct. (less income-tax), leaving a balance of £105 to be carried forward. During the year a considerable number of new residences were erected in Cromer and East and West Runton; and there are indications that this development—the most extensive for many years past—will continue.

Dublin.

The Directors of the Alliance and Dublin Consumers' Gas Company have declared a dividend for the past half-year at the rate of 6½ p.ct. per annum. A sum of £8376 goes to reserve, and £3296 is carried forward. The dividend is slightly more than a year ago.

Dundalk.

The Directors of the Dundalk Gas Company have declared the usual dividends of 20s. and 15s. per share on the "A" and "B" shares respectively.

Fenny Stratford.

The revenue account for the year 1924 of the Fenny Stratford Gas Light and Coke Company, Ltd., showed a balance of £3402, and the Directors recommended the payment of a dividend of 6 p.ct., together with a bonus of 2 p.ct. (less income-tax). A sum of £2000 was placed to general reserve, and £100 to maintenance of mains and services

account. Gas sales increased during the year by 6·4 p.ct. The price was reduced 5d. per 1000 c.ft. at the beginning of 1924, and another reduction by a similar amount took effect from Jan. 1 this year.

Halstead.

The Halstead Gas Company's shareholders had their annual meeting on March 11, when the Chairman proposed the adoption of the report and balance-sheet. During the period covered by the accounts the sale of gas increased by over 8 p.ct., and the output has more than doubled during the past fourteen years. New consumers continue to be added. Dividends of 6 p.ct. and 5 p.ct. are being paid for the year on the preference and the ordinary shares respectively.

Hexham.

Moving the adoption of the report and accounts for the past year of the Hexham Gas Company, Mr. W. Pattinson (the Chairman) said there had been a considerable increase in the consumption of gas, and, notwithstanding that the price was substantially less during 1924 than in 1923, the income from that source was practically the same. The construction of the new carbonizing plant, &c., had been making satisfactory progress, and there was every prospect that it would be in full operation well before next winter. A dividend of 6 p.ct. (less income-tax) on the ordinary stock, inclusive of the interim dividend paid in September, was declared. A balance of £1436 is carried to the next account.

Horley.

The half-yearly meeting of the Horley District Gas Company was held on March 10—Mr. J. W. Stevens (Chairman of Directors) presiding. In moving the adoption of the report and accounts, the Chairman said the results were the most encouraging they had had for some years. The Company had more than earned the dividends recommended, which were as follows: On the preference stock, 5 p.ct.; on the "A" capital stock, 10 p.ct.; and on the "B" capital stock 7 p.ct. per annum—all less income-tax. The amount of carry-forward after the payment of the dividends was £1183. The sales of gas again constituted a record, and showed an increase of 5·87 p.ct. over the December half of the previous year. They had obtained 218 new consumers, and had connected-up 290 new stoves.

Lostwithiel.

Mr. J. H. Jeffery presided at the annual meeting of the Lostwithiel Gas Light and Coke Company, Ltd., at which it was decided to pay dividends of 7s. 6d. per share on the "A" shares and 1s. 6d. per share on the "B" and "C" shares, free of income-tax.

Matlock.

At the annual meeting of the Matlock and District Gas Company, Mr. H. Challand, J.P. (who presided), in moving the adoption of the report, said he thought they would all be satisfied. The accounts showed an increase in one or two respects, and a decrease in others. They had sold 4¾ million c.ft. more gas than they had ever sold before, and their output had now reached 100 millions. The consumption for the past year was an increase of 5 p.ct. on the previous year and 10 p.ct. on 1922. They reduced the price of gas 5d. per 1000 c.ft.; and despite the fact that they had received £2000 less from gas sales, they felt the move was a very wise one. There was a net decrease of income as compared with the previous year of £1234, which, together with an increase in expenditure of £1490, made a total of £2724 less profit for the year. The dividend had been increased to £7 17s. 6d. p.ct., the maximum allowed by their Act, and they would carry forward a balance of £475. It was decided to vote ten guineas to the Darley Dale Hospital.

Newmarket.

At the annual meeting of the Company, Mr. R. Stevenson, the Chairman, said the year's working was satisfactory. The profit earned amounted to £5030, making a balance at the credit of profit and loss account of £13,165. They recommended the payment of a dividend at the rate of 8 p.ct. per annum, less income-tax. This would leave £9445 to be carried forward to the next account. During the year the Directors had purchased premises for the purpose of showrooms, workshops, and stores. The price charged for gas during the year was 1s. per therm.

Otley.

At the annual meeting of the Otley Gas Company, the Directors reported a profit of £2440, which, with the balance brought forward from the previous year, made a total of £10,856. It was decided to pay a dividend at the rate of 8¼ p.ct. for the half-year on the ordinary shares (less tax). The report by the Manager showed that the make of gas had increased by 3·86 p.ct. over the previous year. He referred to improvements in plant and buildings carried out to cope with increasing demand, and to successful business in cookers and fires.

Redhill.

Through the indisposition of Mr. W. Lees Stenning (Chairman of Directors), Mr. Harrie Stacey presided at the annual meeting of the Company. He drew attention to the fact that the accounts included three months' trading of the Godstone undertaking. While the greater part of the capital expenditure during the year represented the value of the Godstone Company's works, plant, and mains, a considerable sum was for extensions at Redhill. The price of gas was reduced by 3½d. per 1000 c.ft., and the present charge approached, within 28 p.ct., that obtaining in June, 1914. Their co-partnership scheme continued to work satisfactorily. They had now over 120 co-partners, who held stock in the Company amounting to £5000. He moved that a dividend be declared in respect of the half-year ended Dec. 31 at the rate of 6 p.ct. per annum on the cumulative preference stock, and 5½ p.ct. on the ordinary "B" stock, together with 5½ p.ct. per annum for five months on the preference "A" stock issued in July, 5 p.ct. for nine months on the Godstone shares, and 5½ p.ct. for three months on the preference "A" stock issued in lieu thereof, all subject to deduction for income-tax. Mr. W. H. Bennett (Managing Director), who seconded the resolution, mentioned that during the year 1010 appliances had been sold.

Seaham Harbour.

Presiding at the annual meeting of the Seaham Harbour Gas Company, Mr. Malcolm Dillon said that, despite increased expenditure, the results of the year's working could be deemed satisfactory—especially when it was borne in mind that a reduction in the price of gas of 1d. a therm had been made during the year. The quantity of gas sold had increased, but the effect of this had been somewhat neutralized by the falling market for residuals. Dividends were declared of 8 p.ct. per annum on the "A" stock and "B" shares, 6 p.ct. per annum on the "C" stock, and 4½ p.ct. per annum on the preference stock.

Shirebrook.

It was reported at the annual meeting of the Shirebrook and District Gas Company that a profit of £4534 had been earned during the year, to which had to be added a balance brought forward of £3785, making the amount available for distribution £8320. A dividend of 10 p.ct. (less tax) was declared, leaving a balance of £5220.

Southgate.

The report submitted at the annual general meeting of the Southgate and District Gas Company revealed an increase in the sale of gas in 1924, as compared with 1923, of 9·79 p.ct. The balance of profit was £14,112; and the payment of dividends of 10 p.ct. per annum on the original capital and of 7 p.ct. on the additional capital (both less income-tax) leaves £5462 to be carried forward.

Tynemouth.

The 59th annual general meeting of the Tynemouth Gas Company was held at North Shields on March 9—Mr. Thomas Young, Chairman of Directors, presiding. In moving the adoption of the report, he said that the trading for 1924 disclosed a profit of £10,646, as compared with £13,204 for the previous year. As from April 1 last the price of gas was reduced by ½d. per therm. The Company had had a rather disappointing year as to the revenue from residuals, and this, together with the effect of the last reduction in the price of gas, was the cause of the smaller balance of profit. The Company employed at present from 300 to 400 persons, and they distributed in the borough about £55,000 annually in wages. They also contributed towards the rates of the area of supply nearly £5000 per annum. Alderman Mason seconded the adoption of the report, which was carried unanimously. The Chairman recommended that the second half-year's dividend to Dec. 31 on the consolidated and new ordinary stock at the rate of 5 p.ct. per annum, and on the new preference stock at 4 p.ct., both less income-tax, be paid. This was carried.

Uxbridge.

Addressing the shareholders at the annual meeting of the Uxbridge, Maidenhead, Wycombe, and District Gas Company, Mr. H. E. Jones said the consumption of gas during the year showed an increase of 6 p.ct.; and had they not had so much work waiting to be done, they could have made this 12 p.ct. As evidence of the progress being made by the Company, he pointed to the fact that in 1924 they put in 359 ordinary and 460 prepayment meters. They had established a profit-sharing scheme, which the Directors considered would be to the advantage of all concerned. The accounts submitted showed a profit for the year of £21,676, and a total sum available of £33,315. After payment of the preference dividends, the Directors recommended a dividend of £6 17s. 6d. p.ct. per annum on the ordinary stock and Maidenhead stock, leaving a balance of £6055 to be carried forward. The price of gas was reduced 1d. per therm from Lady Day last.

Watford.

Reviewing the results of the past year at the annual meeting of the Watford Gas and Coke Company, the Chairman (Mr. E. J. Slinn) said the output of gas showed a 7 p.ct. increase. Last October an agreement came into force with the Rickmansworth Urban District Council to furnish the Council with all the gas required by them for 21 years. To meet the demands of Rickmansworth, they were completing a high-pressure main, holder, and other apparatus, in that district, and were asking for powers to issue new capital when required. Reductions in price since 1921 of over 1s. 8d. per 1000 c.ft. proved that the Directors had done all they could to supply cheap gas. The profit for the year was down by £1530, but was sufficient to pay their interest and dividends. The gas unaccounted for showed a decrease of 6 million c.ft., due to the money spent on main renewals and the good work put in by the Manager (Mr. T. S. Godwin) and his staff in locating leaks.

Wellingborough.

At the half-yearly meeting of the Wellingborough Gas Light Company, dividends were declared at the rates of 7½ p.ct. on the original and 6 p.ct. on the additional shares, less income-tax. The Chairman (Mr. J. T. Parker) pointed out that, though the output of gas had increased, the Company were not getting so much for it, owing to reductions in price. The principle of co-partnership was adopted by the Company in 1909, and there are now 90 co-partners, of whom 83 are shareholders. The total market value of the shares held by co-partners is £7440; and the employees have also on deposit with the Company, accumulated by weekly savings in the provident fund, the sum of £2843. A further development took place in 1923, when the co-partners' pension fund was established.

Woking.

At the recent meeting of the Woking District Gas Company, the accounts were presented for the half-year ended Dec. 31. The Directors reported that, in comparison with the corresponding six months of 1923, gas sales exhibited an increase of 8·74 p.ct., and receipts from residual products an increase of 2·33 p.ct. With a disposable balance of £5321, the Directors recommended a dividend at the rate per annum (less income-tax) of 6 p.ct. on the "A" and "B" ordinary stocks—leaving, after payment of the preference dividends, £3024 to be carried forward.

A reduction of £4000 is to be made in the cost of public lighting at Swansea, by restricting the lighting during the summer months.

TRADE NOTES.

Paints for All Purposes.

A series of pamphlets dealing with exposure tests on the paints manufactured by Messrs. Thomas Howse, Ltd., of Union Works, Smethwick, has been published by the firm. A wide field is covered by the many reports; and the firm claim that their paints are as "safe as 'Howses.'"

A New Lighting Catalogue.

Messrs. William Sugg & Co., Ltd., of Westminster, have published a new list of lamps for public lighting. This contains many interesting photographs of actual installations, and some very useful tables of illumination data and the comparative costs of gas and electricity. The catalogue will be greatly appreciated by all gas engineers and those in any way connected with public lighting, which, with the ever-increasing volume of traffic, becomes daily of greater importance.

Welsbach Spring List.

From the Welsbach Light Company, Ltd., we have received a copy of their spring catalogue, the information in which is printed and set-out in the attractive manner which is a feature of all the firm's publications. A gas iron with a shock-absorbing spring handle is shown. This appliance is fitted with a baffle, which prevents any chance of the flame coming through the outlets.

"The Build of the 'Bungalow' Cooker."

We have received a copy of a 20-page brochure bearing the above title, which has been published by the Richmond Gas Stove and Meter Company, Ltd., of Warrington and London. This book, printed in colours, contains a series of interesting illustrations demonstrating the many practical features of the well-known "Bungalow" cookers. The descriptive matter is written in a convincing style, and the publication will undoubtedly prove of immense help to salesmen, and serve still further to promote the popularity of this series of cookers.

CONTRACTS OPEN.

Pipes, Specials, Engine Oil, &c.

The Gas and Electricity Committee of the Rochdale Corporation are inviting tenders for cast iron mains and specials, wrought iron tubes and fittings, malleable fittings, and engine and other oils. [See advert. on p. 702.]

Coal.

Tenders are invited by the Gas Committee of the Llandudno Urban District Council for the supply of 7000 tons, or thereabouts, of gas coal. [See advert. on p. 702.]

The Lighting Committee of the Leek Urban District Council are prepared to consider tenders for the supply of 8000 tons of washed gas nuts. [See advert. on p. 702.]

Carburetted Water Gas Plant.

Tenders are being invited by the Gas Committee of the Ashford Urban District Council for the supply and erection of additional carburetted water gas plant. [See advert. on p. 702.]

EXTENSIONS.

Loan for New Mills.

The New Mills Urban District Council have decided to make application to the Ministry of Health for a loan of £17,000, to enable them to extend their gas-works.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The same conditions have prevailed on the market during the past week, and the position becomes more and more desperate. There has been further closing of collieries both in Northumberland and Durham, and more and more idle time at those struggling to keep open.

The continuous further curtailment of the output in this way does not seem to make any difference, and it is still as difficult as ever to find trade. Such business as is passing is essentially of the hand-to-mouth variety, and there appears to be no inquiry for forward or contract supplies.

The demand for gas coals is dwindling with other sorts. Wear Specials maintain a nominal quotation of 20s. 9d., and best qualities ask 20s. 3d. f.o.b. These prices are, however, merely nominal, and definite business could almost certainly be arranged at considerable reductions on these figures. Other qualities of gas are obtainable at 17s. to 17s. 6d. f.o.b. Other Durham unscreened makes do little to support the gas market. Coking is obtainable at 17s. 6d. for quite good qualities, and the best bunkers are 18s. to 18s. 3d.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Bleaker weather has given a slight fillip to the house coal trade. Its main effect is to relieve stocks in intermediate hands; production has not been appreciably stimulated. In one or two instances collieries have advanced the price of high-grade coals. Generally speaking, pit-head prices tend downwards. Demand is no better in regard to industrial fuel. Steams are offered at easier rates. Consumptive requirements remain disappointing, and business is mainly on hand-to-mouth lines. Gas coal is not being consumed at the rate anticipated. Some of the undertakings are not able to accept full contract deliveries. Commitments generally being on a larger scale than usual, there is very little chance of placing odd lots which collieries have on hand, though they are offered at three or four shillings below the prices fixed last summer. In some of the centres where there is a large industrial demand for gas coke, and where the domestic consumption has been well organized, the make is being sold at well over 40s. for small carted supplies; but prices are cut by gas-works less favourably placed.

With an extremely sluggish market for pig iron, furnace cokes are not maintaining such a firm grip as formerly. Several Midland furnaces have been blown out, and further curtailment of production seems imminent unless matters improve. Coke is offered at a shilling or two below the scale formerly prevailing; but there is no uniformity, individual bargaining having brought about considerable disparities. Smelters are not disposed to commit themselves far ahead.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

Gas coals under contract in Yorkshire and Lancashire are moving regularly, and it is problematical as to the prices for forward business.

House coals are in rather better demand owing to the colder weather; but the increase of trade has not been sufficient to alter the market.

The situation from an industrial point of view is rather vague, and prices, as a result, remain steady. "Spot" lots of the commoner fuels are available at cheap rates; but these have not been taken advantage of to any great extent.

For shipment there is no alteration; B.S.Y. hards being quoted and sold at 19s. 6d., with furnace coke at 16s. 9d., both f.o.b. Hull. The diminishing foreign export and the closing of pits are still features of the situation at Hull, and there is no sign of early improvement. Prices at Hull at the week-end were (f.o.b. usual shipping ports): South Yorks—Hards, Association, 19s. 6d. to 19s. 9d.; screened gas coal, 20s. 6d. to 21s.; washed trebles, 21s.; washed doubles, 17s. 6d. to 18s. 9d.; washed singles, 17s. 6d. to 17s. 9d.; washed smalls, 13s. 6d. to 14s.; unwashed doubles, 16s. to 16s. 6d.; rough slack, 11s. 3d. to 12s. 3d.; smithy peas, 21s. to 23s. West Yorkshire: Hartleys, 17s. to 19s.; screened gas coal, 20s. 6d.; washed trebles, 19s.; washed doubles, 17s. 6d. to 18s.; washed singles, 17s.; washed smalls, 13s. 3d. to 13s. 6d.; unwashed trebles, 18s. to 19s.; unwashed doubles, 11s. to 11s. 9d. Derbyshire and Nottinghamshire: Top hards, 19s. 3d. to 20s.; washed trebles, 18s.; washed doubles, 18s.; washed singles 17s. 6d.; washed smalls, 13s.; unwashed doubles, 15s. to 16s.; rough slack, 11s. to 11s. 3d. Yorks, Derbys, and Notts: Screened steam coal, 16s. 6d. to 18s. 6d.; gas coke, 21s. 6d. to 26s.; furnace coke, 16s. 9d. to 17s. 3d.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, March 16.

The market for pitch remains unaltered. Little business is reported, and the price is nominal at about 42s. 6d. net per ton f.o.b. works.

Creosote is steady at about 7⅝d. to 7¾d. net per gallon in bulk.

Solvent naphtha, 95/160, is firm at about 1s. 8d. per gallon; pure toluole and pure benzole being about 1s. 10d. net per gallon.

Tar Products in the Provinces.

March 16.

Tar products are still very quiet and unaltered as compared with last week.

Pitch is still dull. A large export order is reported to have been taken on the basis of 41s. f.o.b. east coast.

Creosote continues steady, and export buyers are beginning to inquire for delivery beyond the end of June.

Carbolic and cresylic are still neglected.

Benzole, toluole, and solvent naphtha are firm; but there has been no advance in price.

The average values for gas-works products during last week were: Gas-works coal tar, 29s. 9d. to 34s. 9d. Pitch, East Coast, 40s. to 41s. f.o.b. West Coast—Manchester, 35s. to 36s.; Liverpool, 36s. to 37s.; Clyde, 39s. to 40s.; Benzole, 90 p.c., North, 1s. 7¾d. to 1s. 8¼d.; crude, 65 p.c., at 120° C., 10¼d. to 11¼d., naked at makers' works; 50-90 p.c., naked, North, 1s. 2d. to 1s. 3d. Toluole, naked, North, 1s. 7¾d. to 1s. 8¼d., nominal. Coal-tar crude naphtha, in bulk, North, 7¼d. to 8d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 6⅝d. to 6⅞d.; salty, 6¼d. to 6⅜d.; Scotland, 6¼d. to 6⅜d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 6d. to 1s. 7d. prompt. Naphthalene, £12 to £15; salts, £4 to £5, bags included. Anthracene, "A" quality 3d. per minimum 40 p.c., purely nominal; "B" unsaleable.

Wellington (New Zealand) Gas Company, Ltd.—The Directors state, in their report for 1924, that the results obtained from the Glover-West vertical retort plant continue to be satisfactory, and a further unit will be installed at an early date. The Dessau plant having become obsolete, it has been decided to write off the total amount standing in the books of the Company. To enable this to be done, and to permit of the carrying forward of approximately the same sum as last year, £15,000 has been transferred from depreciation reserve account. A reduction of 3d. per 1000 c.ft. was made in the price of gas in March last. A further reduction of 2d. will take effect from April 1 next. The decrease in the rate of income-tax has considerably assisted the Board in furthering their policy of lowering the price of gas. During the past year, 12 miles of gas mains have been laid. The dividend is 8 p.ct. for the year—leaving £22,852 to be carried forward.

Australian Gas Light Company.—The net profits for the six months ended Dec. 31, 1924, including the balance brought forward, amount to £168,130. The Directors recommended the payment of a dividend of 4 p.ct. for the half-year. This will absorb £117,600, and leave a balance of £50,530 to be carried forward.

Defective Gasfittings.—A Coroner's Jury at Cambridge on Monday drew attention to the need for care in providing against defective gasfittings. The inquest was on the bodies of a devoted couple who were found dead in bed with the gas full on. The Coroner said no blame attached to the Gas Company. Both victims had for some years been without sense of smell.

Increased Gas Prices.—The Harrogate Gas Company have found it necessary to increase the price of gas from 8d. to 9d. a therm. The Spenborough District Council have increased the charge for gas by 1d. a therm, or 4½d. per 1000 c.ft. The advance was due, stated the Chairman of the Gas Committee (Mr. J. H. Collier) to decreased revenue from the sale of residuals. No profit is expected for the coming year, even at this advance in price.

Gas Stoves Without Ventilation.—An inquest was held last week at Middlesbrough on the bodies of a man and his wife who were found dead in bed. There was a small gas stove in the room, which was without any ventilation. The Coroner remarked that the couple were devoted to each other, and everything pointed to the occurrence being an accident. When stoves of this character were retailed, something should be done to warn the purchasers of the need for ventilation.

Radiation Limited.—At the meeting in Birmingham next Tuesday (March 24), the Directors will report that, after bringing £76,376 forward from 1923, the balance of the revenue account for the year ended Dec. 31 is £253,024. After deducting the interim dividends paid in July last, there remains at disposal £189,099, which the Directors recommend be appropriated as follows: To pay a final dividend of 3 p.ct. on the preference shares, less income-tax, £25,284; a final dividend of 3½ p.ct. on the fully-paid ordinary shares, free of income-tax, £48,798; a final dividend of 3½ p.ct. on the partly-paid ordinary shares, free of income-tax, £5297—carrying forward £109,719.

Burnley Gas-Works Estimates.—Alderman Grey, in presenting the estimates for the Burnley rates, referred to the gas-works, and said the department had a rather depressing estimate. Twelve months ago there was an anticipated deficiency of £8025, and the revised deficiency was something like £5000 less; but unfortunately the estimated loss for the coming year was greatly increased, being £12,290. This was very largely attributable to the difference in the market for bye-products. It might be, Alderman Grey remarked, that the Gas Engineer had permitted himself to be unduly pessimistic. If, however, it was a correct survey, it would be necessary by the end of the first quarter to consider the question of revising the charges for gas, in order to meet the deficiency.

Bradford Street Lighting.—The Bradford Corporation Lighting Committee have instructed the Gas Engineer (Mr. Charles Wood) and the Electrical Engineer (Mr. Thos. Roles) to report on the possibilities of improving the lighting of thoroughfares used as tramway and trackless trolley vehicle routes, which will involve most of the main streets. The Engineers are to give estimates of the capital cost, the annual maintenance cost, and the possible effect of any proposal adopted on the output and finances of the gas and electricity undertakings. Information is also to be obtained from other large towns on the subject of the superintendence of street lighting.

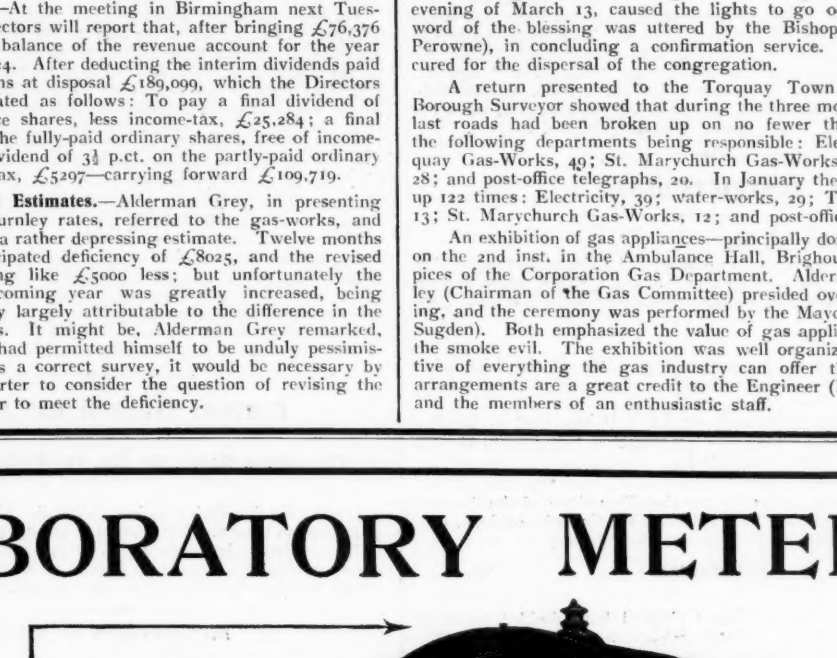
Middlesbrough Gas Affairs.—The Chairman of the Finance Committee (Mr. J. W. Brown), reviewing the situation at the last meeting of the Middlesbrough Town Council, stated that there was invested in the Corporation gas undertaking £625,594. From last March the capital debt had been increased by £304,564, of which £16,805 had gone on the gas-works. This undertaking continued to show very considerable progress. From 1914 to 1924 the number of consumers had increased from 22,417 to 28,837. The average selling price per 1000 c.ft., which was 2s. 4·42d. in 1914, rose to 3s. 9·24d. in 1922, but by the end of the last financial year was down to 2s. 10·93d. During the same period the total consumption increased from 540,000,000 c.ft. to over 850,000,000 c.ft. In 1914 the consumption per head of the population was 4272 c.ft., whereas in 1924 it had risen to 6284 c.ft.

A fusing of electric wiring at Christ Church, Bradford, on the evening of March 13, caused the lights to go out just as the last word of the blessing was uttered by the Bishop of Bradford (Dr. Perowne), in concluding a confirmation service. Candles were procured for the dispersal of the congregation.

A return presented to the Torquay Town Council by the Borough Surveyor showed that during the three months ended Dec. 31 last roads had been broken up on no fewer than 298 occasions; the following departments being responsible: Electricity, 160; Torquay Gas-Works, 49; St. Marychurch Gas-Works, 41; water-works, 28; and post-office telegraphs, 20. In January the roads were broken up 122 times: Electricity, 39; water-works, 29; Torquay Gas-Works, 13; St. Marychurch Gas-Works, 12; and post-office telegraphs, 29.

An exhibition of gas appliances—principally domestic—was opened on the 2nd inst. in the Ambulance Hall, Brighouse, under the auspices of the Corporation Gas Department. Alderman J. F. Bottomley (Chairman of the Gas Committee) presided over the official opening, and the ceremony was performed by the Mayor (Alderman G. F. Sugden). Both emphasized the value of gas appliances in combating the smoke evil. The exhibition was well organized, and representative of everything the gas industry can offer the consumer. The arrangements are a great credit to the Engineer (Mr. C. R. Ingham) and the members of an enthusiastic staff.

LABORATORY METERS.



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STOCK MARKET REPORT.

THE market last week was glutted with gilt-edged stocks, consequent on the substantial sales prior to the dealers becoming aware of the decision to raise the Bank Rate. The delay in notifying the Stock Exchange is still a grievance with the dealers who were caught thereby. Fears of still dearer money prevailed in some quarters, and it was suggested that the rate might be again increased; but this is not anticipated, even if a further rise of ½ p.ct. occurs in the New York re-discount rate. The failure of the Newfoundland issue, of which about 60 p.ct. had to be taken up by the underwriters, did not improve the position. Home Rails sagged still further. The yield at present prices on some of these stocks is very attractive, and holders would be well advised to ignore present market conditions, as the depression seems to have been somewhat overdone. Prices rallied towards the close of the week.

The Industrial Market was fairly steady. There was some profit-taking in the popular shares, but the sales were speedily absorbed, and variations in the quotations were rare. The chief activity on the Exchange centred in the Transvaal Platinum issues, and dealings on Friday continued until a comparatively late hour in the Street.

An issue of interest to Gas Investors is the offer of 12,500 6 p.ct. £10 Preference Shares by the Bournemouth Gas Company at a minimum price of £11 2s. 6d. At this price the yield is £5 7s. 10d. p.ct. The present average quotation is £11, but it must be remembered that the shares will be issued free of expenses. The shares, moreover, are rarely in the market. Of the changes in the quotations, the most prominent were the rise of 5 points, to 95-98, in the Brentford 5 p.ct. preference, and a fall of 6 points in the Tynemouth consolidated to 79-81.

The following transactions were recorded during the week:

On Monday, Bombay 5 1/16, Brentford "A" 108 *ex* div., Commercial 3 p.ct. debenture 58½, European 7⅛, Gas Light and Coke 90¾, 91, 91½, 91¼, 91⅛, 91⅜, 92, 4 p.ct. preference 78⅝, 3 p.ct. debenture 60½, 61½, Imperial Continental 178½, Liverpool 7 p.ct. preference 103, Newcastle 3½ p.ct. 82 1/16 *ex* div., Oriental 103, Primitiva 8s. 3d., South Metropolitan 97, 97¼, 97⅜, 3 p.ct. debenture 60¾, South Suburban 5 p.ct. 107, Southampton 5 p.ct. maximum 84½, Swansea 7 p.ct. preference 101⅜ *ex* div.

On Tuesday, Alliance and Dublin 69, Brentford "A" 105 *ex* div., Commercial 4 p.ct. 93 *ex* div., Gas Light and Coke 91¼, 91⅛, 91⅜, 92, 92¼, 3½ p.ct. maximum 64½, Imperial Continental 177½, 178½, 3½ p.ct. debenture 72, Primitiva 8s., South Metropolitan 97, 97⅛, 97⅜, 97⅞, 98, 6½ p.ct. debenture 103⅜ *ex* div., South Suburban 5 p.ct. 105, 105½, 106, 107, Tottenham "B" 100, 101. Supplementary prices, Guildford cons. 102, 103.

On Wednesday, Alliance and Dublin 60¾, Bahia-Blanca "A" 3s. 9d., Cape Town 4½ p.ct. preference 6½, Commercial 3 p.ct. debenture 58½, Gas Light and Coke 91¼, 91⅛, 91⅜, 92½, 3 p.ct. debenture 62, Imperial Continental 177, 178¼, 178½, Montevideo 63, Oriental 103⅜, 105, Primitiva 8s. 3d., 4 p.ct. 1st debentures 70, 79¼, San Paulo 6 p.ct. cum. preference 7⅞, 8, South Metropolitan 97¼, Southampton 84½, Supplementary prices, Grays & Tilbury "B" 8⅝, 8¾, Southend-on-Sea 5 p.ct. new "B" 87⅜, 88, Sunderland 10 p.ct. max. orig. 103½, Wandsworth 3¼ p.ct. new 98, 100.

On Thursday, Alliance and Dublin 60¾, Brentford 5 p.ct. preference 96½, 97 *ex* div., Brighton and Hove "A" 123½ *ex* div., Continental Union 37, Croydon maximum dividend 83½, 84½ *ex* div., European 7, Gas Light and Coke 91¼, 91½, 91⅜, 92, 92¼, 3¼ p.ct. maximum 64½, 4 p.ct. preference 79, 79⅜, Imperial Continental 177, Primitiva 4 p.ct. 1st debentures 70, San Paulo 6 p.ct. preference 7⅞, 8, South Metropolitan 97, 97¼, 3 p.ct. debenture 61, South Suburban 5 p.ct. 105. Supplementary prices, Brighton and Hove 6 p.ct. "B" preference 105, 4 p.ct. debenture 77, British (Norwich) 3 p.ct. mortgage debentures 54½, 55½, Kingston-upon-Thames 107, 107½, Redhill 5 p.ct. "B" 81⅜, 82½, 4 p.ct. debenture 71, 71½.

On Friday, Brentford "B" 105 *ex* div., Croydon max. dividend 84½ *ex* div., Gas Light and Coke 91¼, 91½, 91⅜, 91⅞, 92, 3½ p.ct. maximum 63¾, 65, 4 p.ct. preference 80, San Paulo 6 p.ct. preference 7¾, 8, 8⅛, South Metropolitan 96¾, 97¼, 97½, Southampton 5 p.ct. maximum 84½. Supplementary prices, Derby 5 p.ct. 109.

The feature of the Money Market was the competition for Treasury Bills. Applications for nearly 62 millions were received for the 35 millions offered. This brought about an improvement, from the Government's point of view, in the average rate at which they were issued; there being a drop of 7d. p.ct. on the previous week's rate, to £4 7s. 10·3d. p.ct. Old day-to-day loans were renewed at from 3½ to 3⅜ p.ct.

Sterling was again conspicuous among the foreign exchanges, the closing quotations being 4.78⅜, and a rise to parity (4.86⅜) is clearly within the bounds of possibility. The Paris cheque showed improvement, the final quotation being 92.72½. Belgian francs were steady; and Neutral Exchanges moved slightly in favour of this country.

Silver was very quiet. There was a drop of ¼d. on the week, and the price for cash closed at 31 1/16d. per oz. Gold also declined 4d., to 86s. 4d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on March 5. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr. %p.a.	Dividends. Last Hf. Yr. %p.a.	NAME.	Quotations. Mar. 13.	Rise + or Fall − on Week.	Transaction Lowest and Highest Prices.
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	78—81	..	..
335,492	,,	,,	4	4	Do. 4 p.c. Pref.	71—76	..	..
1,551,868	,,	Sept. 25	6	6½	Alliance & Dublin Ord.	65—70	..	69—69½
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	61—66	..	..
300,000	5	Oct. 23	8	8	Bombay, Ltd.	5—5⅛	..	5 1/16
100,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	12—13*	..	..
425,050	10	,,	7	7	Do. B 7 p.c.	12½—12¾*	..	..
150,000	10	,,	6	6	Do. Pref. 6 p.c.	10¾—11¼*	..	..
50,000	Stk.	Jan. 8	3	3	Do. 5 p.c. Deb.	56—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	76—79	..	..
992,045	,,	Mar. 5	6 3/16	6 3/16	Brentford A Con.	103—110*	..	105—108
990,500	,,	,,	6⅛	6¼	Do. B New	103—110*	..	105
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	95—98*	+5	96¼—97
906,690	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	76—81	..	..
181,337	,,	,,	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	,,	Mar. 5	11½	12½	Brighton & Hove Orig.	165—170*	..	..
244,200	,,	,,	8¼	9¼	Do. A Ord.	122—125*	..	123½
1,287,500	,,	Feb. 19	5	5	Bristol 5 p.c. max.	96¼—97¼*a	..	..
855,000	,,	Sept. 25	7	8	British Ord.	115—120	..	..
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	123—128	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	Dec. 18	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref.	6—7	..	6½
130,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
626,860	,,	Feb. 19	6	6	Cardiff Con. Ord.	101—104	..	..
237,860	,,	Jan. 8	7¼	7¼	Do. 7½ p.c. Red. Deb.	105—108	..	..
137,150	,,	Feb. 19	5	6¼	Chester 5 p.c. Ord.	89½—94½b	..	..
1,513,280	,,	Mar. 5	6	5/14/8	Commercial 4 p.c. Cap.	93—95*	..	93
560,000	,,	,,	6	5⅝	Do. 3½ p.c. Cap.	91—94*	..	..
475,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	57—60	..	58½
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	37—42	−2	37
200,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	88—92	..	..
660,000	,,	Mar. 5	6¼	6¼	Croydon sliding scale	100—103*	..	..
284,975	,,	,,	5	5	Do. max. div.	83—86*	..	83½—84½
492,270	,,	Feb. 19	6	9	Derby Con.	110—112*c	..	109
55,000	,,	Jan. 8	4	4	Do. Deb.	74—76c	..	..
1,002,180	1	Jan. 22	6	4	European, Ltd.	7—8	−⅛	7—7⅛
16,460,070	Stk	Feb. 19	5½	5½	Gas Light & Coke 4 p.c. Ord.	91—93	+1¼	90¾—92½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	62—65	..	63½—65
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	79—81	..	78½—80
4,761,930	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	59—62	..	60½—62
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 11	6½	6½	Hastings & St. L. 5 p.c. Conv.	95—100	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	75—80	..	..
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Mar. 5	10	10	Hornsey 7 p.c.	138—143*	..	..
1,976,000	,,	Nov. 20	30	10	Imperial Continental Cap.	175—180	..	177—178½
263,950	,,	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	71—74	..	72
235,242	,,	Aug. 14	6½	6½	Lea Bridge 5 p.c. Ord.	98—103	..	..
2,127,340	,,	Feb. 19	5½	5½	Liverpool 5 p.c. Ord.	87½—88½b	−½	..
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	100—109b	..	103
165,736	,,	Feb. 19	9	8	Maidstone 5 p.c. Cap.	122—132	..	..
63,480	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	54—59	..	..
75,000	5	Dec. 4	7	5	Malta & Mediterranean	4—4½	..	..
541,920	Stk.	Nov. 20	4	4	Montevideo, Ltd.	62—67	..	63
2,061,315	,,	Mar. 5	5	5	Newcastle & Gateshead Con.	82—82½*d	−½	82 1/16
300,929	,,	,,	4	4	Do. 4 p.c. Pref.	72½—73½*d	..	..
529,705	,,	Dec. 18	3½	3½	Do. 3½ p.c. Deb.	68—69d	..	..
15,000	10	Mar. 5	11	12	North Middlesex 10 p.c.	15½—16½*	..	..
75,940	10	,,	7 7/16	8⅜	Do. 7 p.c.	11—11½*	..	..
300,000	Stk.	Dec. 4	7	9	Oriental, Ltd.	102—107	+2	103—105
138,120	,,	Jan. 8	7⅛	7⅛	Plym'th & Ston'house 5 p.c.	109—114	..	..
60,000	50	Mar. 5	13	14	Portsea Island B	96—99*	..	..
100,000	50	,,	12	13	Do. C	93—98*	..	..
2,289,909	1	—	—	—	Primitiva Ord.	8/0—9/0	..	8/0—8/3
311,100	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	78—80	..	79—79½
600,000	Stk.	Jan. 22	4	4	Do. 4 p.c. Red. Deb. 1911	63—65	..	..
220,335	,,	Dec. 18	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	7⅞—8⅛	..	7⅞—8⅛
125,000	50	Jan. 2	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Aug. 28	5/8/4	5⅛	Sheffield A	104—106s	..	..
419,968	,,	,,	5/8/4	5⅛	Do. B	104—106s	..	..
1,047,000	,,	,,	5/8/4	5⅛	Do. C	104—106s	..	..
90,000	10	Oct. 23	8	6	South African	7—9	..	..
6,609,895	Stk.	Feb 19	5	6¼	South Met. Ord.	96—99	..	96¾—98
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb.	59—62	..	60¾—61
734,000	,,	Mar. 5	6¼	6¼	Do. 6¼ p.c. Red. Deb.	102½—104¼*	..	103⅛
91,500	,,	Mar. 5	8½	8½	South Shields Con.	135—136*d	..	..
1,187,795	,,	Feb. 19	6½	6½	South Suburban Ord. 5 p.c.	105—110	..	105—107
368,837	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	97—100	..	..
647,740	,,	Nov. 6	5	5	South'mpt'n Ord. 5 p.c. max.	83—86	..	84½
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	72—77	..	..
250,000	,,	Mar. 5	7	7	Swansea 7 p.c. Red. Pref.	101—103*	..	101½
200,000	,,	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	+1	..
120,000	,,	Feb. 19	8	8	Tottenham District A 5 p.c.	116—119	..	..
88,275	,,	,,	6½	6½	Do. B 3½ p.c.	100—103	..	100—101
181,255	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	75—79	..	..
258,251	,,	Aug. 28	7/14/4	5	Tynemouth Con. and New	79—81d	−6	..
187,294	,,	Feb. 19	6½	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	100—105	..	..
68,320	,,	,,	5	5	Do. 5 p.c. pref.	93—98	..	..
91,800	,,	,,	—	6½	Do. 5 p.c. Maidenh'd	90—95	..	..
30,900	,,	Mar. 5	9½	9½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	135—140*	..	..
855,636	,,	,,	7⅜	7⅜	Do. B 3½ p.c.	114—119*	..	..
392,935	,,	,,	6/9/6	6/9/6	Do. C and New	97—102*	..	98—100
352,000	,,	,,	7⅜	7⅜	Wimbledon 5 p.c.	109—114*	..	..
98,600	,,	,,	7⅜	7⅜	Epsom 5 p.c.	117—122*	..	..
38,416	,,	Dec. 18	3	3	5 p.c. Deb.	57—60	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle, *s.*—Sheffield. * Ex. div.

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By order,
FRANK DAY,
Secretary.

709, Old Kent Road,
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March 14, 1925.

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ALEX. MORRISON,
Town Clerk.

Bridge of Allan,
March 10, 1925.

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